

Open Research Online

The Open University's repository of research publications and other research outputs

Mental and motor representation for music performance

Thesis

How to cite:

McGuinness, Andrew (2010). Mental and motor representation for music performance. PhD thesis The Open University.

For guidance on citations see [FAQs](#).

© 2010 The Author



<https://creativecommons.org/licenses/by-nc-nd/4.0/>

Version: Version of Record

Link(s) to article on publisher's website:

<http://dx.doi.org/doi:10.21954/ou.ro.0000eb4d>

Copyright and Moral Rights for the articles on this site are retained by the individual authors and/or other copyright owners. For more information on Open Research Online's data [policy](#) on reuse of materials please consult the policies page.

oro.open.ac.uk

Andrew McGuinness BA (Music), Grad.Dip.Ed.(Tech), MPhil (Electronic Arts)

Mental and motor representation for music performance

Thesis submitted for the degree of Doctor of Philosophy at Open University, UK

Relevant disciplines: music and philosophy

Date of submission: 14 October 2009

Date of Submission: 16 October 2009

Date of Award: 4 October 2010.

Preface

I want to mention some people who were important in helping this thesis along. My Principal Supervisor, Martin Clayton, provided warm personal support and careful reading which provided a thread of continuity through the several false directions the thesis took. David Roden, who gave serious comments on the ramblings of a novice philosopher. Udo Will, who it was always a pleasure to see, and who provided a different perspective.

I am grateful to the ever-helpful staff of the Research School at Open University; and to the IT department who promptly replaced a burnt-out hard hard drive so that I could meet a deadline.

Colleagues in the ethnomusicology area at Open University made the experience of a PhD both more stimulating and more human: Mark Doffman, Byron Dueck, and especially Laura Leante.

Lucian McGuinness continues to be an inspiration and a model in career and life. Last but by no means least, it was a series of conversations with Kirsten Packham which first pointed my thinking in the direction which eventually pointed to these ideas.

Andy McGuinness

Ho Chi Minh City, December 2010

Contents

Abstract.....	1
1 Introduction: Creative music performance.....	2
1.1 Introduction.....	2
1.2 The problem.....	2
1.2.1 Creative music listening.....	2
1.2.2 Music and discourse.....	6
1.3 Motor creativity in music performance.....	9
1.4 How the thesis is laid out.....	11
1.4.1 A note on the approach used in the thesis.....	16
2 What is creativity?.....	17
2.1 Introduction.....	17
2.2 Margaret Boden's 'The Creative Mind'	17
2.2.1 Conceptual spaces and generative rules.....	17
2.2.2 Transformational creativity.....	19
2.2.3 Four phases of creativity.....	21
2.2.4 H-creativity and P-creativity.....	23
2.3 Summary.....	32
3 Semiotic approaches to music.....	33
3.1 Introduction.....	33
3.2 Naomi Cumming and musical subjectivity.....	33
3.2.1 Subjective listening.....	34
3.2.2 Individual style in performance.....	36
3.3 Musical gesture.....	39
3.3.1 What are gestures?.....	39
3.3.2 Thomas Turino: semantic arrest.....	42
3.3.3 What kind of signs are gestures?.....	43
3.4 Congeneric meaning.....	45
3.4.1 Why is congeneric meaning in music important?.....	45
3.4.2 The autonomist doctrine of musical meaning.....	45
3.4.3 Congeneric signs and reference.....	46
3.4.4 Reference and likeness.....	47

3.5 Summary.....	52
4 Hardcore music rehearsal and performance.....	53
4.1.1 Introduction.....	53
4.1.2 Background of the study.....	53
4.1.3 Minimization of cognitive involvement in performance.....	54
4.1.4 Felicitous performance.....	57
5 The indefinite and immanent meanings of music.....	60
5.1 Introduction.....	60
5.2 Jean-Jacques Nattiez: polysemy and indefinite meaning.....	60
5.3 Eduard Hanslick: Meaning is immanent in music.....	62
5.4 Susanne Langer: Music as unconsummated symbol.....	64
5.5 Indeterminacy of meaning, polysemy, processuality.....	66
5.5.1 Music and polysemy.....	67
5.5.2 The processuality of music.....	68
5.6 Immanent meaning.....	69
5.6.1 The internal 'logic' of music.....	69
5.6.2 Musical signs as Peircean icons.....	71
5.6.3 Congeneric iconic signs.....	73
5.7 Summary.....	75
6 Perceptual reduction and immanence.....	76
6.1 Introduction.....	76
6.2 Immanence and perceptual reduction.....	76
6.2.1 Primary representations and proximal sensing.....	76
6.2.2 Achieving perceptual reduction.....	78
6.2.3 Sound as located events.....	79
6.3 The phenomenology of sound.....	81
6.3.1 Husserl's phenomenological reduction.....	81
6.3.2 Schaeffer's sound object.....	82
6.3.3 Immanent essences.....	84
6.3.4 Empirical types.....	86
6.4 Summary.....	90
7 Conceptualization and music.....	91
7.1 Introduction.....	91
7.2 Observational concepts.....	91
7.2.1 What makes observational concepts observational?.....	91
7.2.2 What makes observational concepts conceptual?.....	94

7.2.3	Observational concepts in audition.....	95
7.2.4	Observational concepts in music.....	99
7.2.5	Observational concepts, eidetic variation, and congeneric iconic signification.....	99
7.3	Theory-laden observation.....	100
7.3.1	What is theory-laden observation?.....	100
7.3.2	Encapsulation and theory-neutral observation.....	101
7.3.3	Observational concepts and proximal percepts.....	102
7.3.4	Failure of diachronic encapsulation.....	103
7.3.5	Theory-laden observation in music listening.....	105
7.4	Categorical perception of rhythm as theory-laden observation.....	109
7.4.1	Categorical perception of rhythm.....	109
7.4.2	Background theories of meter and rhythm patterns and observation.....	110
7.5	Summary.....	113
8	Present experience.....	115
8.1	Introduction.....	115
8.2	The phenomenology of time consciousness.....	116
8.2.1	Temporal consciousness.....	116
8.2.2	The paradox of the specious present.....	117
8.2.3	Husserl's retentions and protentions.....	118
8.2.4	Properties of the specious present.....	120
8.3	Identity without identification.....	121
8.3.1	Thing-awareness and fact-awareness.....	122
8.3.2	The most basic concept.....	122
8.4	Individuation and continuing identity in visual perception.....	124
8.4.1	Perceptual selection.....	124
8.4.2	Selection is automatic and computational.....	126
8.4.3	Objecthood is not conceptual.....	126
8.5	Individuation and continuing identity in auditory perception.....	129
8.5.1	Auditory stream segregation and segmentation.....	129
8.5.2	Mechanisms of auditory streaming.....	130
8.5.3	Auditory streaming as nonconceptual selection and tracking.....	131
8.5.4	Auditory stream segmentation: hearing discrete proto-events.....	131
8.6	Summary.....	132
9	Nonconceptual perception in music.....	134
9.1	Introduction.....	134
9.2	Information and representation.....	135
9.2.1	The problem of classification.....	135

9.2.2 Analog and digital signals.....	136
9.2.3 Generalization versus abstraction.....	137
9.2.4 How we abstract.....	139
9.2.5 Haugeland's representational genera.....	140
9.2.6 Intermediate representations.....	141
9.3 Relational perception.....	143
9.3.1 Peacocke's analogue perception.....	143
9.3.2 Perceptual demonstrative concepts.....	145
9.3.3 Supplemented and unsupplemented perceptual demonstratives.....	146
9.4 Nonconceptual hearing in music.....	147
9.4.1 Modular processes in music.....	147
9.4.2 DeBellis's argument for the nonconceptual content of music perception.....	148
9.4.3 Relational perception and polysemy in music.....	150
9.4.4 Processuality and nonconceptual content.....	153
9.5 Summary.....	154
10 Motor creativity in music performance.....	156
10.1 Introduction.....	156
10.2 Carruthers's Creative Action Theory of creativity.....	157
10.3 The sedimentation of action goals.....	160
10.3.1 Forward and inverse models and the historical-teleological connection.....	162
10.4 Motor intentionality and skillful coping.....	164
10.4.1 Dreyfus's skillful coping.....	164
10.4.2 Perception for action and nonconceptual relational perception.....	165
10.4.3 Forward and inverse models in skillful coping	167
10.4.4 Where are the goals in goal-directed motor actions?.....	168
10.5 Music performance as skillful coping.....	170
10.6 Creativity versus sedimentation.....	172
10.7 Summary.....	175
11 Conclusion.....	177
REFERENCES.....	182

Table of Figures

Figure 1 The Müller-Lyer illusion.	104
Figure 2 Stimulus format for rhythm categorization.	109

Abstract

This research proposes a theory of nonconscious motor representation which precedes mental representation of the outcome of motor actions in music performance. The music performer faces the problem of how to escape sedimented musical paradigms to produce novel configurations of dynamics, timing and tone colour. If the sound were mentally represented as an action goal prior to being produced, it would tend to be assimilated to a known action goal. The proposed theory is intended to account for creativity in music performance, but has implications in other areas for both creativity and motor actions.

The investigation began with an ethnographic study of two 'posthardcore' rock bands in London and Bristol. Posthardcore musicians work with minimal explicit knowledge of music theory and cognitive involvement in performance is actively eschewed. Serendipitous musical felicities in performance are valued. Such felicities depend on adjustment and fine control of dynamics, timing and tone colour within the parameters of the given.

A selective survey of music aesthetics shows that the defining qualities of music are the production of immanent rather than representational meaning; polysemy; and processuality. Taking an analytic philosophy and cognitive science approach, I argue that apprehensions of immanent meaning depend on relationships between proximal percepts within the specious present. A general argument for nonconceptual perceptual content as perception of relations between magnitudes within the specious present is extended to music and argued to account for both the polysemic richness of music and its processuality. Nonconceptual relational perception can account for novel apprehensions by music listeners, but not for the production of novel configurations by the performer. I argue that motor creativity in music performance is achieved through the nonconscious parameterization of inverse models without conscious representation of the goal of the action. Conscious representation for the performer occurs when they hear their own performance.

1 Introduction: Creative music performance

1.1 Introduction

This thesis is concerned with creativity in music performance. Specifically, it proposes a kind of motor creativity which does not depend on the prior existence of a representation in consciousness of the outcome of the motor actions used to produce sound in performance. This is important for a theory of motor creativity because, as I shall argue, conscious representations (such as representations of passages of music with a particular configuration of dynamics, accent, timing and timbre) tend to reproduce patterns of relationships which conform to familiar paradigms. In order to produce novel configurations of elements, some strategy for escaping habitual perceptions is required.

This chapter presents the question which guided my research. I first outline the problem which my argument for motor creativity is intended to solve. The notion of 'sedimented' perception is introduced, and it is argued that perceptions are subject to sedimentation due to the habitual perceiving in accordance with the discourse of a particular culture. Harris Berger's (1999) documentation of the death metal community in Akron, Ohio, is presented as an example of the operation of discourse on musical perceptions. I then move to a discussion of Theodore Gracyk's (2001) characterisation of (popular) music works as Kuhnian paradigms. The question arises: How can musicians and listeners escape sedimented perception to hear a specific musical exemplar in a different way?

At the end of this chapter, I return to the view of musical creativity in performance as creating new percepts. I argue that imagined (auditory) percepts, like actual (auditory) percepts do not escape perceptual sedimentation, and outline Peter Carruthers's (2007) creative action theory of motor creativity.

1.2 The problem

1.2.1 Creative music listening

There are two main questions which my thesis addresses, both concerning the process of creativity in music. The first is how listeners and performers alike can come to hear an unfamiliar organisation of musical elements as a new kind of musical meaning, rather than assimilating it to some familiar organisation and meaning. The second is how musicians are able to generate novel organisations of musical elements in performance, in order to create meaning in a new way.

Music (like other arts) is recognised as the outcome of a creative process. To be creative is normally held to involve making or discovering something which is both novel or somehow surprising, and of value:

Creativity is the ability to come up with ideas or artefacts that are *new, surprising and valuable*.

(Boden 1990: 1, italics in original)

In the case of the musician, this will be something of specifically musical value. An issue identified by Wilfrid Sellars (1997) in 'Empiricism and the Philosophy of Mind' is relevant to this particular problem of creativity:

[I]nstead of coming to have a concept of something because we have noticed that sort of thing, to have the ability to notice a sort of thing is already to have the concept of that sort of thing, and cannot account for it.

(Sellars 1997: 176, italics removed)

If Sellars's statement is true, then not only music listeners but also music performers can only notice those musical events as being *X* for which they already possess the concept *X*. I will not argue with this statement as such, but it is immediately apparent that something has been left out of the story about music performance and music listening—at least if we accept that music performers and composers can produce new musical ideas and that music listeners can apprehend the new ideas in some manner. It may be that some nonconceptual apprehension of *X* precedes the formation of a concept of *X* by an individual, following which that individual is in a position to notice tokens of *X* where they occur. If we do not accept that new musical ideas can be—somehow—produced and apprehended (perhaps without being conceptualised or named), then we must necessarily accept the alternative: that all music simply utilises different combinations of the same basic stock of concepts, and has done so since humans first exhibited musical behaviour.

That this is not the case can be seen from the fact that we do gain new musical concepts. Assume for the moment that every musical device ever utilised is simply a token of a type which has always, somehow, existed in the minds of at least some humans. These tokens can vary in quantity (as the musical idea 'add more voices' can be instantiated with few or many additional voices) and can be combined in infinitely many combinations and configurations. Since the type need not exhaust the properties of its instantiation (for instance, the type 'add more voices' could be co-instantiated with the type 'descend in pitch' so that the result was more voices, at a lower pitch), a sound event occurring at a particular time could function as a token (or part of a token) for potentially more than one type, or musical concept. It is just conceivable that such a situation could eventually lead to the flowering of the Classical style in the Western notated art music of Europe in the eighteenth century, in the music of (among others) Haydn, Mozart and Beethoven. The particulars of the Classical style would then be due to a combination—idiosyncratic to that time and place in history—of pre-existing musical

concepts: concepts such as (for example) difference in pitch, in timbre, in loudness. But at that point in time, we must acknowledge the existence of identifiable concepts, concepts such as 'dominant chord of the relative major key', which did not exist before that idiosyncratic combination of pre-existing musical concepts began to coalesce into that particular style. It is true that we might have to search back more than a few centuries to be sure that no-one would recognise it by another name, but it is beyond reasonable doubt that no human living in Neolithic times had a concept corresponding to 'dominant chord of the relative major key', such that they would be able to recognise tokens of that type as they occurred in the context of a Mozart composition.

We have also to acknowledge that composers such as Haydn, Mozart and Beethoven each developed an individual style which is distinguishable from the others and recognisable to many music listeners. The important aspect of these individual styles is not simply that they are identifiably different from other composers of the time, but that there is musical value in the particularities of their individual styles. If the 'Mozart style' could be distinguished from the others by perceptible differences of sound which yet made no difference to the musical import of the works (for instance, particular choices of instrumental timbre which, somehow, made no difference to the musical value), then the argument could be made that it did not constitute a new musical concept. (There are, perhaps, many lesser composers whose identifiable individuality is no more than idiosyncrasy and does not hold musical value.) But in fact, Mozart, Haydn and Beethoven are valued precisely for the unique musical achievements which make their works identifiable to a knowledgeable listener. The modern-day listener to the great Classical composers has almost certainly learnt through a process of musical discourse at least some (if not all) of the musical concepts which enable them to identify a work as being by Mozart, Haydn or Beethoven—yet it still remains to be accounted for how these three composers (and others) were able to develop new musical ideas (whether concepts or not) and how their original listeners were able to apprehend them (whether conceptually or not). This is the question which my thesis attempts to answer—although with reference to the performance of a particular style of rock music, rather than to the Classical composers.

It is surely true that we tend to interpret any new experience in terms of what we understand of experiences which we have had in the past—a process of categorization of experience begins as soon as we direct our consciousness towards any phenomenon. The argument that we can perceive only what we have learned to perceive follows from the argument for our general inability to categorise anything—perception or knowledge—without first holding a concept of that category. Rosenberg's (2009) summarises Sellars's position as being

... that the senses per se grasp no facts, that all knowledge that something is such-and-so (all “subsumption of particulars under universals”) presupposes learning, concept formation, and even symbolic representation[.]

(Rosenberg 2009)

For our consciousness to exhibit ‘aboutness’ or intentionality towards anything—perception or mental object—entails that we have some conception of the object of intentionality:

Intentionality is not only being conscious *of* something but being conscious of something *as* something, where the *as* is hermeneutical, constrained by contents stored on the backstage of intentionality.

(Gallagher 1998: 106, italics in original)

While epistemic conformity arises through participation in a linguistic community, its effect on the individual pervades all kinds of experience:

The schemas that organize intentional experience [...] depend on our prior experience and the more general experience we gain by being members of a linguistic community. Furthermore, schemas are not just cognitive. They may be practical (schemas of developed skills and practical habits) or emotional (based on both idiosyncratic and cultural patterns), or normative, and so forth.

(Gallagher 1998: 150)

Thus, although an individual may develop their own idiosyncratic schemas which organize intentional experience, still those schemas through long use become sedimented. Habitual ways of responding to experience constrain the kinds of experience of which an individual can be aware. Not only is what we can notice determined by the concepts we possess, as Sellars argues, but perception and behaviour are channelled by preconceptual (or ‘prenoetic’—Gallagher’s term) factors which by definition are not available for inspection. The result for perception is that there is never

a direct, innocent apprehension of X; intentionality always involves the interpretation of X as some kind of Y. Some category or perspective will always be in operation; the *as* will always constrain the *of*.

(Gallagher 1998: 148-49, italics in original)

This applies both to high-level concepts (such as the recognition of musical styles) and to the most basic elements of perception. It is with the basic elements of musical perception that I am concerned in this thesis. I shall refer often to ‘sedimented perceptions’, by which I mean perceptions which, as Gallagher argues, are constrained by our habitual schemas of perception, which in turn are mutually imbricated with our schemas for acting in the world, and the culture, in which we find ourselves. In the thesis, I argue for a mode of music perception and music performance which escape sedimented perceptions through processes of nonconceptual perception and action. I therefore do not mean to dismiss Sellars’s insight that

having the concept of *X* precedes noticing *X*, but only—at this stage—to emphasise that the formation of some musical concepts must involve a process of learning other than (or in addition to) that of participation in the discourse of a community.

1.2.2 Music and discourse

In popular music studies, the communal creation of musical meaning through discourse is well established. Harris Berger, for example, is explicit in his characterisation of 'perception as practice' (1999: 171) among a community of death metal listeners in Akron, Ohio. Berger argues that qualities perceived in any individual harmonic progression are not in themselves essential, but rather the result of hearing in a particular way:

While perception is not capricious imagination - the listener constitutes perceptual experiences from the physical givens of acoustical sound - it is the listener's perception that establishes a collection of simultaneous pitches as a tonic or a dominant and that assembles the chords just grasped as 'melancholic' rather than, for example, phlegmatic.

(Berger 1999: 162)

Perception according to Berger (1999: 164) is a social practice. Themes of chaos and disruption in death metal predispose listeners to hear melodic lines (riffs) as fragmented. Consider this description of the way a death metal musician hears a passage in one of his own songs:

The traditional harmonic interpretation tacitly implies a listener grasping all the notes of the bar as a unit and allowing the first three beats to effect the tonal designation of the fourth beat; Saladin's experience of the part depends instead on constituting two separate units and radically disjoining those units from one another in the living present.

(Berger 1999: 170)

Saladin's perception of the harmony was not idiosyncratic or isolated—his hearing of the particular passage was shared by his band members and the general perception of death metal music as fragmented was shared by members of the death metal community in Akron. This shared perceptual bias, according to Berger, emerges from 'culturally based assumptions about the organisation of musical sound' (1999: 170), learned through the practices of 'composition, rehearsal, promotion and performance, of consuming and listening to recordings, of correspondence through letters and fanzines, and of casual socialising in the scene' (1999: 172).

An argument for why such shared practices are necessary might go something like this. A listener hearing music with which they are unfamiliar will try to relate what they are hearing to music with which they are familiar. According to Theodore Gracyk (2001), in doing this, listeners draw on paradigms as given in particular pieces of music:

A paradigm is an exemplary case or body of work around which a community organizes its practices and beliefs.

(Gracyk 2001: 69)

Music listeners need exemplars to supply paradigms so that they will be able to recognize other examples of the same 'sort of thing' in new music. Gracyk asserts that 'exemplars have a normative function within a community' (2001: 69). However, while musical paradigms constrain, they do not determine subsequent practice. Exemplars are particular works not styles, and subsequent works which take the exemplar as a paradigm may be in a different style (Gracyk 2001: 70). Exemplars are concrete instances which are susceptible to different conceptualizations by different individuals. Conceptions of the paradigm will differ to a greater or lesser extent between individuals, including between different musicians. The music that an individual musician produces in accordance with their conception of a paradigm might not fit the conception which a particular listener has of the same paradigm. It is the shared practices of musical discourse—listening, discussion, composition, rehearsal, promotion and performance—which work to produce not only a shared paradigm but a shared perceptions of it. The paradigm itself is a concrete work or body of works, open to a variety of perceptions. Indeed, without the shared conception, new works would no longer contribute to a shared paradigm and the scene would fragment. For example, Berger's (1999: 170) initial perception of death metal riffs depended on a sedimented schema of harmonic interpretation by which the listener grasps all the notes of the bar as a unit and allows the first three beats to effect the tonal designation of the fourth beat; this was in opposition to perceptions of the death metal community, who heard riffs as fragmented.:

I laboured to emphasise the D/D# trill and disjoin the notes of the fourth beat from the notes of the first three beats; working against the sedimented influences of my music school training, I used these mental rehearsals to hear the recordings as a wildly chaotic part, constantly shifting between E minor and an unrelated trill of ambiguous tonality.

(Berger 1999: 172)

Shared schemas such as those operating in the death metal community of Akron, Ohio and the shared perceptions to which they give rise constrain both the way in which individual musical works are perceived and therefore, whether they are accepted as exemplars of the body of works which constitutes the paradigm. If the shared schemas do not result in perceptions which fulfil the function which music serves in the community—Berger (1999: 173) describes the death metal fans of Akron as actively using the music to explore negative emotions—then the musical work in question will not be accepted as an exemplar of the paradigm.

The shared practices of musical discourse, then, work to produce shared perceptions of musical works and the musical events which they comprise. On the other hand, what appears to remain unexplained is how musicians and listeners come to have new conceptions of

musical organisation, whether of a whole style or of some creative innovation within a style. Certainly, it is possible to conceive of the practices of musical discourse as introducing individuals to new conceptions, in addition to or indeed as a necessary part of its normative function in relation to the paradigm. But if normative discourse is needed to ensure a shared conception, how do heterogeneous conceptions within the community come about in the first place? We might assume that members of the death metal community initially utilised a variety of perceptual schemas to listen to music, learnt within the wider community by listening to music other than death metal. It could be argued that the coherence of the death metal style is simply a matter of sub-cultural emphasis on some ways of hearing, at the expense of others, but that the ways of hearing emphasised are a subset of ways of hearing learned in the wider community—but this would be to dismiss death metal as being no more than a collection of features drawn from other styles and given a different emphasis. Just as Mozart, Haydn and Beethoven are valued precisely for the unique musical achievements which make their works identifiable to a knowledgeable listener, so particular death metal bands are identifiable to and valued by knowledgeable listeners for their individual style. While the music devices of 'popular' music have not been subjected to the extensive categorization and labeling which has been applied to the Western 'classical' music canon (and when they have been, they have often enough been mistakenly assimilated to the perceptions of the Western classical music academy (see Berger 1999: 162)), the fact that individual bands are identified and valued for the differences of style they achieve indicates that each of those styles constitutes a category *sui generis*, and therefore involved novel perceptions for performers and listeners.

The first question for my thesis then, is how listeners and performers can approach the novel content of works, possibly based on a familiar paradigm but differing in conception. If it is true that 'even such "simple" concepts as those of colors are the fruit of a long process of publicly reinforced responses to public objects (including verbal performances) in public situations' (Sellars 1997: 176), then how can anyone ever perceive a new kind of musical structure or organisation? I would assert that individuals are able to apprehend novel musical ideas without social reinforcement in relation to public objects, at least in incremental steps. But even if this kind of individual creative hearing of new musical ideas were discounted—that is, if individuals necessarily depend on learning new ideas through a process of public reinforcement—then how does the public conception of new musical ideas arise? That it does arise cannot be doubted—the extraordinary proliferation of new musical styles in popular music since the 1950s can hardly be dismissed as inconsequential variants of pre-existing paradigms. Rather, it is the musically creative differences between styles which are important for listeners—for fans in Akron in the 1990s for instance, the difference between death metal and thrash or hardcore was important to the listening experience and not merely in demarcating subcultures (Berger 1999: 165).

In fact, it could be argued that it is the essential nature of art in general to stimulate the audience to organize their experience in different ways. Literary theorist Victor Shklovsky in 1917 wrote that the function of art was to undo habitual perceptions:

If we start to examine the general laws of perception, we see that as perception becomes habitual, it becomes automatic.

[...]

The purpose of art is to impart the sensation of things as they are perceived and not as they are known. The technique of art is to make objects 'unfamiliar,' to make forms difficult, to increase the difficulty and length of perception because the process of perception is an aesthetic end in itself and must be prolonged.

(Shklovsky 1917/1988)

If this is so, the way we approach perception is fundamental to the constitution of art as art. In the coming chapters, I argue that the experience of perception which music offers is specific to the temporal nature of audition. I argue that creative apprehensions depend on a particular process of nonconceptual perception, and that bringing this kind of perception to bear on music results in apprehensions which are polysemic, indeterminate, processual and labile.

1.3 Motor creativity in music performance

A process of nonconceptual perception might account for the escape by listeners from sedimented perceptions, but there is a problem in using it to account for the creative production of new musical organisations by performers. If the perceptual process underpins the apprehension of new musical ideas, the performer is in a 'chicken-and-egg' situation. They apparently need to hear the new musical idea in order to be able to perform it; but they must perform it in order to be able to hear it. Which comes first? In the final chapter of this thesis, I propose a theory of motor creativity in which novel organisations of musical material are produced in performance without first being represented in the mind of the performer. I argue that the kind of nonconceptual perception utilised in creative listening is underpinned by the nonconscious perception used for action, which deals with relations of magnitude between objects and events in the world.

While the argument has been made that in general, musical creation in performance arises from motor creativity (Carruthers 2007), that will not be the line I will pursue. The hardcore bands I studied appear to generate new material largely through a systematic pursuit of accidents—new riffs were found by experimenting until something caught the ear and successful combinations of different parts played by band members by listening back to rehearsal recordings. Such an approach to 'found' musical materials suggests a listening approach similar to that used by listeners in coming to hear new musical ideas.

Rather than motor creativity in the generation of new material, therefore, I argue for motor creativity in the felicitous performance of established repertoire. Like much rock music and like the bulk of Western classical music, hardcore is not an improvisatory style. The music is given in terms of the sounds, notes and rhythms which will be played; in Western classical music this is normally in terms of a notated score (interpreted according to stylistic norms for the particular

period and composer), while hardcore musicians depend on a combination of motor and aural memory. Assuming these given constraints are competently satisfied, a performance (in both Western classical and rock music) may be felt by the performer and audience as being more or less felicitous. There is a somewhat greater degree of freedom in hardcore performance than is generally found in classical performance, producing for instance occasional unplanned dramatic changes in loudness which are brought about by the whole band acting in serendipitous synchrony. However, more often a felicitous performance accomplishes a fine control of dynamics, timing and tone colour with a degree of precision which is beyond conscious control. The attainment of this state in performance was explicitly and highly valued by some of the hardcore musicians I interviewed. That such control must depend on nonconceptual representations is suggested by Peter Carruthers, in an argument for motor creativity:

Someone executing a novel sequence of notes on the saxophone, for example, or a novel sequence of bodily movements in a dance, doesn't *just* play those notes or make those movements. For these might, indeed, be actions that the agent has names and/or concepts for ("E flat, followed by F, followed by C flat," or "Up a fourth, down a fifth," and so on). But the agent will also choose a precise length for each note, or a precise speed for each movement, for which there is no name (and probably no concept). Likewise, the agent will add a precise timbre to the playing of the note, or a precise articulation to the movement. Although intentional, these aren't actions that can plausibly be captured fully in any sort of propositional/conceptual description.

(Carruthers 2007: 257, italics in original)

Such a description certainly fits with the argument for nonconceptual perception which I make for creative music listening. However, the production by the performer of fine adjustments which form the material into a new pattern for creative apprehension presents a problem. The listener is free to approach the music with nonconceptual perception, and so arrive at a novel perception which is not determined by sedimented perceptions. However, the performer must produce the new patterning of material before they can have the opportunity to perceive it:

Thus a dancer's thought that precedes and explains a novel set of movements might take the form "I shall move my arms *thus* while moving my legs *so*." But what, on this account, would fix the intentional content of the two indexicals "thus" and "so"? Since the thought precedes the action, those indexicals can't be grounded in a *perception* of the movement in question, in the way that the indexical in a thought such as "I shall pick up *that* apple" can be grounded in an analogue/nonconceptual percept of the object seen. Thus the only remaining possibility is that the contents of the indexicals in a movement determining thought are given imagistically. Hence, when the dancer thinks "I shall move my arms *thus*," the content of "thus" will be given by a proprioceptive or visual image of a particular set of fine-grained movements of the arms.

(Carruthers 2007: 257-58, italics in original)

In the case of the musician, the grounding image would be an auditory one of the passage about to be played, with the fine-grained adjustment of dynamics, timing and tone-colour which

constitute the creative patterning of the material. Carruthers argues that performance just happens too fast for that to occur, and his argument has merit. However, there is a more fundamental objection to the notion of a nonconceptual indexical image preceding a novel production, and that is that it simply pushes the production of a novel percept back one step. Presumably sedimented perception applies as much to images as to percepts, and intentionality towards self-produced auditory imagery is as much 'constrained by contents stored on the backstage of intentionality' (Gallagher 1998: 106) as are auditory perceptions. So far from resulting from a prior auditory image subject to the constraints of perceptual sedimentation, some of the musicians I interviewed made it clear that felicitous performance produces outcomes which are surprising to all those involved. The experience of pleased surprise is an acknowledged phenomenon of music performance, for example,

jazz improvisers are often surprised by their own products. This is direct evidence in support of the view being proposed here: that actions can be creative without prior creative thought. For surprise is the emotion that we feel when something *unexpected* happens. But the expectations in question don't have to be consciously entertained. On the contrary, events can be most surprising when they violate tacit expectations that it would never have occurred to us to formulate consciously otherwise. So when a jazz improviser is surprised by the sequence of notes that he hears himself play, this is evidence that he didn't have a prior expectation (whether conscious or unconscious) that he would play just those notes.

(Carruthers 2007: 258)

There is evidence, then, that the first apprehension of a creatively nuanced passage that music performers have is not an image prior to production, but a perception of the passage they have just produced in performance. If this is so, then some kind of motor creativity is involved. The actions produced without representation of the outcomes are not just habitual motor actions made in the presence of some stimulus. I argue that the kind of nonconceptual perception involved in creative music listening has its roots in nonconscious perception for action, and propose that creative action is a direct realization of desire without prior conscious representation.

1.4 How the thesis is laid out

I do not intend to pursue the ethnographic study of hardcore music any further than this. The brief overview above will serve as an illustration of the phenomenon to be investigated.

The remainder of the thesis begins with a review of Margaret Boden's (1990) 'The Creative Mind'. I critique several arguments in Boden's stimulating book, including the attribution of generative rules as underpinning particular acts of creativity in music, and the notion of H-creativity (historical creativity) as applied to music.

A brief survey of the kinds of ways in which music can mean follows, by way of situating the particular focus of my topic within the broader debate on music and meaning. I draw on Naomi Cumming's (2000) 'The Sonic Self', a systematic application of Peircean semiotic theory to music aesthetics, using it to frame discussion of other writers on musical semiosis, notably Wilson Coker (1972) and Thomas Turino (1999). The commentary on Cumming serves to define my a narrow area of interest within the wide field of music aesthetics. I do not aim in this thesis (on the one hand) either to account for all the ways in which music can mean, or (on the other) to systematically develop a theory of musical semiosis. Rather, I draw selectively on the literature on music aesthetics to highlight a particular notion of musical meaning as non-representative.

One aspect of C.S. Peirce's semiotic system—iconic signification—is used as a springboard from the aesthetic discussion and a reference point for the exploration of non-representative musical meaning which follows. This exploration utilises the tools of cognitive science: philosophy of mind, together with readings in psychology and neuroscience. Accordingly, the section on Cumming's 'The Sonic Self' is followed by a review of the music aesthetics of Eduard Hanslick, Susanne Langer, and Jean-Jacques Nattiez. From these three writers I extract some agreement as to the essential, defining qualities of music. The most important of these is the immanence of musical meaning—that extramusical reference may be unavoidable but is not what distinguishes music as an art form. In addition, music is polysemic, its immanent meanings are 'inexhaustible' (Langer 1969: 239), due to the multiplicity of 'relations within relations' (Langer 1969: 93) it exhibits. The third essential attribute of music is its processuality. Music performance is a continuous bodily process, not of making thought audible but of thinking in sound through the actions of the body.

The perception of immanent meaning in music involves a suspension of normal perception. In a process of perceptual reduction, distal percepts are suspended and proximal percepts are given 'primary representation' (Dretske 1981). ('Proximal' and 'distal' are complementary terms and mean, respectively, 'closer to' and 'further away from' a central point. As Dretske uses the terms, distal percepts are perceptions which represent the objects of perception as being in the world and are the normal mode of perception. Proximal percepts involve an awareness of sensory stimulation as it affects the sensory organ. For example, the proximal visual percept of an approaching car becomes larger as the car comes closer; the distal percept represents a car of constant size, coming nearer at a particular speed.) Giving proximal percepts primary representation is equivalent to the phenomenological *epoché* of Husserl, which Pierre Schaeffer (1966) applied to auditory perception via the process of 'reduced listening'. Immanent meaning in music is generated through a process of intra-musical signification. Musical events are signs which refer to each other. I argue that the process of meaning generation in music can be characterised as a system of 'congeneric iconic signs'. Musical signs are congeneric because signifier and referent are of the same kind—the usual hierarchical relationship between referent and signifier is supplanted by a mutually referring relationship. Musical signs can be characterised as Peircean icons because they represent through similarity (Peirce 1955). The

signified of musical congeneric iconic signs is the abstract similarity between two similar-but-different concrete musical events.

Exploring the ramifications of the immanence of meaning in music, I oppose perceptual reduction, in which proximal percepts are given primary representation over the objects and events they represent, to perceptual constancy. I argue that the intramusical relationships which create immanent meaning displace the normal everyday relationships between auditory perceptions and the world. Various features of rock gigs contribute to this effect, including the experience of immersive sound which masks other auditory cues to the integrity of the environment, and the lack of obvious source bonding in the electronically processed sounds of the instruments.

Phenomenology involves a deliberate process of perceptual reduction. In Husserl's phenomenological reduction, the essence of an immanent percept is found through a process of eidetic variation. Pierre Schaeffer's (1966) application of the eidetic variation to auditory percepts results in the identification of essential sound objects with 'objective reality'. I critique Husserl's eidetic variation, arguing that the immanent essences which are revealed are in fact sedimented perceptions—and therefore cannot be the result of creative music listening. This leads to the conclusion that creative listening requires the actual perception of concrete (not imagined) musical events in present experience.

Reviewing the notion of observational concepts through Christopher Peacocke's (1983) work, I note that a variety of different immanent percepts fall under a single observational concept. In this, I argue they are a special case of congeneric Peircean iconic signification, with the abstract signified of the sign corresponding to the observational concept. What makes observational concepts conceptual is that they conform to Evans's (1982) Generality Constraint—that is, that same concept is observable in response to different stimuli and the observer is able to conceive of the present experience as falling under a different concept. I show how Husserl's immanent essences revealed through eidetic variation meet the Generality Constraint, and argue that immanent essences (including Schaefferian objective sound objects) are observational concepts. I argue that an individual percept can only be perceived as falling under a concept if the concept is already possessed by the perceiver—that is, all percepts which fall under a concept are sedimented perceptions. Creative apprehension of novel organisation of musical elements can only occur nonconceptually and nonconceptual perception can only occur on the basis of percepts in present experience.

I review the controversy over theory-laden perception (Fodor 1984; Churchland 1988; Fodor 1988) and argue that theory-laden perception in music arises both from implicit background theories of music and from the explicit learning of music-theoretic concepts—both lead to the sedimentation of perceptions. I review a study of categorical perception of rhythm (Desain and Honing 2003) as an example of theory-laden perception based on explicit music-theoretic concepts.

Since nonconceptual perception can only be on the basis of percepts in present experience, I give a brief overview of Husserl's (1991) phenomenology of time consciousness. Of the various properties of the 'specious present', the experience of movement or succession, and the ability to synthesize a meaningful apprehension out of a series of perceptual events are two that are important for music perception. The feature which I focus on is the phenomenological continuity of identity of an object of perception, through changes in its properties.

The notion of 'identity without identification'—the continuing identity of an object of perception, independent of its properties, is introduced through Fred Dretske's (1993) distinction between 'thing-awareness' and 'that-awareness'. The continuing phenomenological identity of the object of visual perception can be naturalised in terms of a subpersonal process of the visual system which automatically selects and tracks visual objects (Pylyshyn 2007). An analogous process for auditory perception can be found in the subpersonal processes of auditory stream segregation identified by Bregman (1990). Bregman also identifies processes of auditory stream segmentation into discrete events.

I develop a theory of nonconceptual relational perception which draws on Haugeland's (1991) description of iconic representation and on Christopher Peacocke's (1986) notion of 'analogue' content. Nonconceptual relational perception is contrasted with Dretske's (1981) notion of 'digital' representation, which involves a drastic reduction of information in the process of generalization. Nonconceptual relational perception abstracts across a series of immanent perceptual events so that concrete relations between different percepts are retained as part of the representational content. Their content is richer and at the same time less determinate than completely digitized representations. The retention in the representation of concrete relations is the means by which perception can escape sedimentation and abstract novel patterns from experience. I argue that Mark DeBellis's (1995) argument for nonconceptual content in music perception is consistent with nonconceptual perception as relational. The richness of relational perceptual representations accounts for the polysemy identified in music. I propose that the processuality of music is due in part to labile, continuously evolving nonconceptual representations abstracted from the stream of auditory events.

In the final chapter, I address the problem of how novel organisations of fine-grained patterning of timing and dynamics can be produced. The argument of the thesis to this point has been that apprehension of novel musical patterning requires nonconceptual perceptions, which are dependent on percepts within present experience. If nonconceptual apprehension of novel patterns depends on present perception, it would appear that the musician cannot produce a prior auditory image of the new pattern without first having a perception on which to base the auditory image; on the other hand, the first perception could not be produced from nothing and would in turn depend on a prior perception—and so on, an infinite regress.

I review Peter Carruthers's (2007) Creative Action Theory of creativity and identify a circularity: action schemata are described as giving rise to images representing the action in question, but the motor schemata themselves are, in Carruthers's account, already dependent on a

conceptual representation of the proposed action. Accordingly, I proceed to an investigation of the basis of sedimentation of action intentions.

On the basis of Joëlle Proust's (1999) explication of the structure of intentional action¹, I ascribe the sedimentation of motor action to the origin of individual actions in the learned association of motor commands with sensory effects: these become the goals which are available to the agent. The link between motor action goals and motor commands comes about over time through the repeated association of particular sensory effects with particular motor commands in an appropriate context of desire. The association is at first accidental and through repetition develops into a motor action which is available to achieve a specific (motor) goal. It is achieved partly through the operation of nonconscious 'forward models', which generate internal information about the expected sensory input at each stage of the action, for comparison with actual sensory input and correction of the ongoing action movement.

An alternative kind of motor action was described by Merleau-Ponty (1962) in terms of 'motor intentionality'. As described by Hubert Dreyfus (1996; 2002a; 2002c; 2002b), motor intentionality exhibits 'skillful coping' without goal representations. I argue that perception for skillful coping underpins the kind of nonconceptual relational perception described in Chapter 6.

Forward models of motor actions predict both the state of the organism and the expected sensory input resulting from the action, and operate nonconsciously to provide feedback for control of fast motor actions (Wolpert, Gharahmani et al. 1995; Wolpert 1997). 'Inverse models' are the motor commands generated to achieve an action. I argue for the involvement of forward models for motor actions in cases where goals are consciously represented and the absence of these where conscious representation is absent—that is, specifically in the movements made in skillful coping. I propose a mechanism for skillful coping which relies on the dynamic combination of inverse models (Wolpert and Kawato 1998; Davidson and Wolpert 2004) without forward models.

Dreyfus's notion of skillful coping seems applicable to the idea of motor creativity in music performance in some ways. For instance, nonconscious perception for action can be argued to underpin conscious nonconceptual relational perception. Also, skillful coping is an embodied response to the whole situation of the agent, rather than a response depending on propositions about some of its features. However, it is not easy to account for creativity using the model of skillful coping, particularly since creativity presumably depends on the flexibility of human consciousness. In many cases, the overarching goal which skillful coping subserves will have been originally specified via representation (as when learning to drive a car or learning to play tennis). On the other hand, where an implicit goal has been inculcated through eg. social mores (such as maintaining appropriate social distance) the agent is constrained by virtue of

¹ Although I reproduce the term 'intentional action' while referring to the literature on action, my own argument does not depend on the philosophical notion of intentionality. I shall refer to 'action intentions' and 'action goals' interchangeably.

habitus. I speculate that motor creativity might depend on a process of skillful coping in the absence of any explicit or implicit goal.

1.4.1 A note on the approach used in the thesis

Unfortunately, much of the material on which I have drawn is couched in terms of visual perception. This has necessitated that I engage with the arguments in terms of visual perception before translating the ideas to the domains of auditory perception and of music.

2 What is creativity?

2.1 Introduction

In this chapter I review Margaret Boden's (1990) 'The Creative Mind', which explores the implications of computer models of human creativity. While I accept many of Boden's undeniably valuable insights, I argue that the computational models she describes all differ from the form of creativity I investigate in this thesis, by virtue of the set of conceptual assumptions with which each is provided.

2.2 Margaret Boden's 'The Creative Mind'

2.2.1 Conceptual spaces and generative rules

Boden identifies three forms of creativity: making unfamiliar combinations of familiar ideas; exploring conceptual spaces; and transforming a conceptual space (1990: 3-5). Of these, in my view making unfamiliar combinations is a heuristic: put together a variety of somehow incongruous ideas and you may be surprised by connections between them emerging as something useful, or funny, or otherwise meaningful. If there is more to either the search for fruitful combinations and the recognizing of them when they occur, this heuristic does not capture it. Importantly, novel combinations of familiar ideas are not classified as creative unless we find them to have some point which is of value to us (Boden 1990: 3). While heuristics may be an important part of the whole process of creativity (whether used consciously or unconsciously), they can be applied without achieving a creative outcome. Something else needs to happen for creativity to occur.

Boden characterises conceptual spaces as 'structured styles of thought'. A conceptual space is learnt from some cultural group where it is already in existence; it is 'any disciplined way of thinking that is familiar to (and valued by) a certain social group' (Boden 1990: 4). Someone who arrives at a new idea within such an established style of thinking is engaged in what Boden calls 'exploratory' creativity. Boden likens the known paths of thought within a conceptual space to the motorways marked on a map: exploring the conceptual space further is like leaving the marked road to explore the countryside not marked on the map. The English language is creative in this sense, according to Boden: English language speakers (and the same applies to other languages and their speakers, of course) can generate any number of grammatically correct sentences—this is exploration of the 'conceptual space' of English grammar (1990: 49). A conceptual space, then, is the space defined by all possible applications of a set of generative rules, in whatever discipline that occurs.

Some work has been done to produce sets of rules which can generate either compositions within an existing style—Boden discusses computer-generated compositions in various classical styles (Cope 1991; Cope 2001) and computer-generated jazz solos (Johnson-Laird 1993)—or expressive performances of existing compositions in the classical canon (see eg. Bresin, De Poli et al. 1992; Battel, Bresin et al. 1994; Mazzola and Zahorka 1994b; Mazzola and Zahorka 1994a; Widmer 1994; Widmer 1996; Friberg and Bresin 1997; Bresin 1998; Friberg, Bresin et al. 1998; Stange-Elbe and Mazzola 1998; Bresin 2000; Hirata, Hiraga et al. 2000; Widmer 2000; Widmer 2001; Hirata and Hiraga 2002). As an example of work in this field, Boden discusses in detail Christopher Longuet-Higgins's grammars of classical music harmony and rhythm (Longuet-Higgins 1987). Interesting as this work is, the basic difficulty with abstracting generative rules after the fact of creativity (that is, rules which reproduce an existing style of composition or performance) is that there is no guarantee that they correspond with what actually happens in people's minds—as Boden acknowledges:

Whether people perceive melodies by means of mental processes exactly like the heuristics used in Longuet-Higgins' programs is another question. Whatever program we consider, it is always possible that a different one might produce the same results.

(Boden 1990: 105)

Now the point about the idea of musical paradigms discussed in the first chapter is that they are concrete exemplars and not generative rules. In fact, Boden provides an example which neatly illustrates the working of paradigms—although her terminology refers to “computational ‘coulds’ “ which can either be ‘timeless’ or ‘temporal’ (1990: 49). Her example is the number sequence 1, 4, 9, 16, 25, 36, 49 which can be described either by the rule ‘ s_n is the square of n ’ (for $n = 1, 2, \dots, 7$); or by the rule ‘ s_n is the sum of the first n odd numbers’ (for $n = 1, 2, \dots, 7$). The sequence is a paradigm which in itself does not indicate which rule generated it—either can be abstracted from it:

Now, instead of regarding these seven numbers as a timeless mathematical structure [ie. in terms of the rule which generated them], consider them as a series actually written down by a friend – or by a computer. How were they produced?

(Boden 1990: 50)

The aim of the kind of computational models of creativity which Boden describes in her book is to answer that question—as is the aim of much musical analysis. But the question which a musician asks when they treat a musical work as a paradigm is more like, How could I produce something which I will like in the way I like this work? The result, given the different value different people give to the same musical events in the work—and indeed, the different perceptions they may receive while listening to the work—can be radically different for two different musicians.

While musical discourse may operate to constrain the generation of new exemplars so that they function for the audience in similar ways as existing exemplars in the body of works which the

agreed paradigm comprises, the exemplars themselves can serve as paradigms for works in different styles and genres (where a genre comprises a musical style and the subcultural context to which the style belongs).

Perhaps this fluidity of concrete exemplars with regard to the generative rules which are implicitly attributed to them by listeners is the cause of part of the 'difficulty of identifying aesthetic values clearly enough for them to be expressed in computational terms' (Boden 1990: 305). Thus, a superficially coherent body of work such as the villas designed by sixteenth-century architect Andreas Palladio might not embody a single set of generative rules but instead constitute a paradigm comprising exemplars accountable by different generative rules. If this were true, then the fact that 'art historians have long disagreed about just what are the underlying rules' (Boden 1990: 308) would hardly be surprising, and nor would the need for *ad hoc* fixes in the Palladium program produced to clarify the rules. In fact, it may be the tendency of artists and their audiences to begin to apprehend works in a long-established style as products of a set of implicitly understood generative rules which prompts the drive for a new style—rather than Boden's explanation of the exhaustion of the conceptual space of generative rules which are established concurrently with the advent of a new style:

When the rules of have been well and truly tested, so that the generative potential of the style is reasonably clear, boredom and/or curiosity invite a change in the rules.

(Boden 1990: 60)

This is not to assert that no artist produces by recourse to a set of generative rules, but rather to argue for a a less clear-cut division between the categories of creativity which Boden sets up.

2.2.2 Transformational creativity

Boden is concerned to debunk one mystery about human creativity and to explain another. The first is the view which is sometimes mistakenly held that creativity is the province of an elite of geniuses and the like, rather than a part of the everyday life of normal people. This mystery she rightly dismisses:

[Creativity is] not a special 'faculty' but an aspect of human intelligence in general: in other words, it's grounded in everyday abilities such as conceptual thinking, perception, memory, and reflective self-criticism.

(Boden 1990: 1)

The second mystery is the very existence of creativity:

Creativity itself is seemingly a mystery, for there is something paradoxical about it, something which makes it difficult to see how it is even possible. How it happens is indeed puzzling, but that it happens at all is deeply mysterious.

(Boden 1990: 11)

This mystery is what Boden seeks to illuminate and ultimately explain with computational models of creativity (although she does not claim that this aim has yet been achieved). The kind of creativity which is the exploration of a conceptual space is hardly mysterious in this way, although it may require a high level of both formal and tacit knowledge and the ability to manipulate the knowledge intelligently. On the other hand, the kind of creativity which Boden describes as 'fundamental' or 'transformational' creativity does appear to deserve being called a mystery:

A merely novel idea is one which can be described and/or produced by the same set of generative rule as are other, familiar, ideas. A radically original, or creative, idea is one which cannot.

(Boden 1990: 51)

Boden uses the term 'fundamental creativity' to denote that kind of creativity which produces something which is not only improbable, but impossible within the existing conceptual framework (1990: 41-42). These are cases where the new idea could not have arisen from the generative rules (implicit or explicit) of the conceptual space; they are 'transformational' because they transform the conceptual space: Boden's question is, How does this occur? There must be, as she insists, some kind of intelligible story which would account for fundamental creativity:

If we take seriously the dictionary-definition of creation, 'to bring into being or form out of nothing', creativity seems to be not only unintelligible but strictly impossible. No craftsmen or engineer ever made an artefact from nothing. [...] The 'explanation' of creativity thus reduces either to denial or magic.

(Boden 1990: 11-12)

But 'creativity' (as opposed to the dictionary meaning of 'creation') does not mean to create matter out of the void, like a god or a sorcerer. It means to create some kind of idea, which in the artefacts the craftsperson or engineer makes, is embodied in the physical object. Now, it may be true that even very creative craftspeople never make something from nothing even in this sense—rather they build on forms and ideas which they or others have previously created. And yet, even while utilising previous ideas, at least sometimes they create something which is not just a new combination of ideas but genuinely new in itself—and Boden acknowledges this when she says of transformational creativity that 'thoughts are now possible which previously (within the untransformed space) were literally inconceivable' (1990: 6). Since, as Boden notes, 'the mind's creations must be produced by the mind's own resources' (1990: 40) the conceiving of inconceivable thoughts is a paradox. However, it is paradoxical only if we deny

that creativity can effect a transformation in our way of thinking, and this is what Boden insists creativity can do:

The deepest cases of creativity involve someone's thinking something which, with respect to the conceptual spaces in their minds, they *couldn't* have thought before.

(Boden 1990: 6)

2.2.3 Four phases of creativity

Poincaré distinguished four phases of creativity, which became known as 'preparation', 'incubation', 'illumination', and 'verification' (Boden 1990: 29). The preparation phase involves conscious work and the use or adaptation of familiar methods for solving a problem, but unsuccessfully. Incubation follows, where the problem is shelved for a period ('for minutes or for months' - *ibid*: 30) and the conscious mind is engaged in unrelated activity. During this phase, unconscious work is assumed to be done on the problem, unconstrained by the rationality of the conscious mind. A flash of insight follows—the illumination phase. The verification phase follows, in which the insights are worked out in their ramifications and tested. Boden suggests that a better term for this phase in the arts, as opposed to mathematics and the sciences, is 'evaluation' (*ibid*: 30).

In my view, the crux of creativity appears to be incubation and illumination rather than preparation and verification. Of course, preparation and the work of verification are necessary, but many people undertake thorough preparation in a discipline, without going on to notable acts of creativity in that discipline. Again, once an artistic or scientific breakthrough has been made, there are often many people besides the original innovator who carry on exploration of the ramifications of the breakthrough (of the new 'conceptual space' which it makes possible).

Looking at artistic production in this way casts a curious light on the kind of performance creativity which is the focus of this thesis. In the kind of creative performance which is the subject of my investigation, there is no separation at all between the moment of illumination and the moment of working out. Rather than occupying interleaved moments, in the special case I describe illumination and production are the same thing. I do not mean only that they are inseparable—two processes occurring in one activity and overlapping or even fused in time—but that illumination occurs by means of production.

Of course, even the most aggressively diy² punk band has a repertoire of basic musical gestures which are conceptualised and can be talked about and reproduced at will, things such as playing an E chord on the beat, repeating the same thing four times, and so on—the skills which enable the band members to play same the same song at the same time. These skills constitute the craft of the musician and most rock bands have a much higher level of craft than my hypothetical punk band. Such conceptualised musical gestures are presumably the worked-

² 'diy' means 'do it yourself', and indicates a whole ethic of making music with minimal or no music training and instrumental expertise.

out result of some earlier moment of illumination, and not illumination-by-means-of-production. Moreover, the development of material (the initial creating of songs) does happen through the kind of activity described above, involving interleaved moments of illumination and working out (and also moments of incubation). However, at the time when the song is performed, the interleaved process of composition is at least arrested (if not necessarily finished). In performance, the developed material (the song) becomes a vehicle for a different kind of creativity: motor creativity.

What actually happens in incubation and illumination? Very little concrete can be said about incubation: only that it—somehow—leads to a moment of illumination. Boden writes of the popular view of intuition as ‘the hidden mental faculty explaining ‘creativity” (1990: 36). She gives the example of Michael Faraday, who is supposed to have found many advanced mathematical theorems by means of intuition and not by deduction from mathematical formulae; and of Carl Gauss, who claimed to have found the solution to a problem and knowing it to be correct, yet could not prove it (Boden 1990: 36). Insights like this are mysterious, if anything in creativity is. Even given the occurrence of intuitions which turn out to be mistaken, what remains to be explained is how any intuition without a rational justification can be the pointer to a real insight.

Boden ascribes the workings of intuition, at least in part, to tacit or unformalised knowledge (1990: 35). Koestler in ‘The Act of Creation’ (1964) suggested that creativity resulted from the ‘unconscious combination of ideas drawn from different domains’ (Boden 1990: 34). Ideas are combined by generating analogies, utilising visual imagery and ‘concrete (sometimes personal) exemplars of abstract ideas’ and heuristics such as shifting emphasis or reasoning backwards (Boden 1990: 33). What is interesting about this in relation to my thesis, is that sensory imagery (whether visual or not) and concrete exemplars of abstract ideas both involve a step down the ladder of abstraction. If visual imagery and concrete exemplars of abstract ideas are already an abstraction from sensory input, they are at least less abstract than what they stand for in such cases. In fact, visual imagery and concrete exemplars stand in the same relation to the abstract ideas to which they refer, as exemplars of a musical paradigm stand in relation to the set of generative rules which is assumed to underpin them.

If finding analogies is key to (at least some) creativity, Koestler rightly emphasises that our perception of likeness is unexplained:

'Similarity' is not a thing offered on a plate [but] a relation established in the mind by a process of selective emphasis ... Even such a seemingly simple process as recognising the similarity between two letters 'a' written by different hands, involves processes of abstraction and generalization in the nervous system which are largely unexplained ...

(Koestler 1975: 201; quoted in Boden 1990: 34)

In light of all these considerations, Boden frames three questions in relation to insight or intuition:

How is it that people can notice things they were not even looking for? How can people recognize that two somewhat different things (two letters 'a', or two apples) fall into the same class? How is it possible for tacit knowledge to be acquired without being explicitly taught, and how can it aid creation?

(Boden 1990: 36)

Leaving aside the issue of acquiring tacit knowledge, the two other questions are of even more interest if taken together. How is it possible for people to recognize a likeness between two different things, when the likeness is not something for which they already possess a concept? If the issue is not one of two different letters but of two unfamiliar shapes which are nearly the same—how is it possible to recognize that they are 'nearly the same'? The issue is not one of assimilating them both to a known concept (eg. recognizing that they are both closed curves) but of recognizing a likeness between them which is new (at least to the perceiver) and in the process creating a new perception. The recognizing of new kinds of likeness or similarity seems to be key to the act of creation. Creativity at the level of sensory perception is the central topic of my thesis, but the recognizing of new kinds of likeness can be seen in the making of analogies at higher levels of abstraction. Where analogies are used to find creative insights they often involve a step down in the level of abstraction, utilising concrete exemplars and visualisations. This can be seen as a way of undoing existing abstractions, a letting go of established knowledge in order to create new knowledge. The combining of different, often quite disparate, ideas in the search for fruitful analogies can be seen as a heuristic by which to escape familiar concepts or habitual patterns of thought—the practical, emotional and normative schemas organizing intentional experience which Gallagher (1998: 150) identifies. It will be seen from my argument here that I disagree with Boden (1990: 53) when she contrasts 'mere combination, or bisociation of unrelated matrices' with the 'radical creativity' which she calls transformational creativity. In my view, combination or 'bisociation' (Koestler's term) are simply heuristics, but heuristics which may indeed lead to radical creativity by offering opportunities to recognize likeness between disparate things.

2.2.4 H-creativity and P-creativity

Boden makes a fundamental distinction between 'psychological' creativity' and 'historical' creativity (P-creativity and H-creativity for short):

P-creativity involves coming up with a surprising, valuable idea that's new *to the person who comes up with it*. [...] But if a new idea is H-creative, that means that (so far as we know) no one else has had it before: it has arisen for the first time in human history.

(Boden 1990: 2, italics in original)

As Boden notes, 'for someone who is trying to understand the *psychology* of creativity, it's P-creativity that's crucial'. In this thesis, I am interested in the process of creativity, rather than whether or not any creative outcome has been achieved before—and indeed, for the process which I describe, it does not matter even if the creative outcome has been achieved before by the person achieving it now. My notion of creativity does not require that the creative idea be conceptualised, which means that it is in principle possible for a musician (or for that matter a dancer, a painter, or other artist) to repeatedly discover the same idea in performance (or in the practice of making art), and for that idea to be valuable—if it was valuable the first time, why not on subsequent occasions? If the idea was not conceptualised but rediscovered, it may not be surprising in one sense (because performer and artist might recognize it as somehow familiar) but it will at least be unpredictable in the sense that its essential features had not been grasped.

Might it be possible that music (and it perhaps has this in common with some other arts) is valued precisely for the opportunity for nonconceptual thought which it offers? Still, even if this notion is accepted, it must be acknowledged that the performances and recordings of some performers are more valued by listeners than the performances and recordings of other performers. However, whether this qualifies as a kind of H-creativity is uncertain.

An argument might be made for H-creativity in the case of the performance style of a performer which is valued by a large number of people because it is considered unique. It is true also that such a new style of musical performance (or other artistic output) is likely to influence other practitioners, and in this way it could be called an advance. One example of an advance in performance style might be advances in technique: the range of technical and expressive possibilities in piano performance was greatly expanded due to the influence Franz Liszt, for instance.

On the other hand, the pursuit of historical authenticity in the performance of Western notated art music from previous centuries suggests that something besides historical newness is valued. 'Authentic' performances of this kind deliberately valorise a return to an earlier style of performance, eschewing the expanded range of instrumental and expressive techniques which intervening centuries have added to the repertoire. However, this need not mean that authentic performances are less musically valuable (or for that matter that they are less technically difficult to produce). So, even though cases of musical H-creativity can be identified, it must also be acknowledged that (for at least some performances) something is valued in whatever is created in the act of performance besides its historical newness. Indeed, the value attached to the music of past decades and centuries (whether recordings or notated compositions)

indicates that historical newness for music (and perhaps other arts) does not hold the same unproblematically positive value as might be attributed to historical newness in scientific discovery.

In fact, even for scientific discoveries historical newness can be a concept lacking clarity. Implicit in the H-creativity of scientific discovery is the notion that H-creative outputs are better than previous concepts in some way (for instance, an H-creative concept might give a better fit to the available data; it might explain some phenomenon previously unexplained, or it might enable the production of a new technology which was not previously possible). It is this implicit notion of improvement which qualifies a scientific creative insight as valuable, so that it can therefore be considered whether it is H-creative.

But H-creativity requires not only that the creative individual have the idea, but they evaluate it correctly. If insights occur to an individual which with hindsight we can identify as creative if the individual had evaluated them correctly, why can we not call this 'creativity'? Boden's point is that without evaluation of creative products by the creator there is no way to distinguish between intuitions which are creative and false intuitions. Both Copernicus and Kepler thought of the idea that the planets orbit with an elliptical motion and both rejected it (Copernicus never realizing his mistake) (Boden 1990: 37). For Copernicus, the idea of elliptical orbits took on the status of a false intuition, and (Boden would argue) its re-evaluation following later scientific developments can no more rehabilitate it to the status of a creative insight than (say) a random guess at the number which will come up on a roulette wheel can be called prior knowledge if it turns out to be correct.

The criterion of evaluation cannot be applied in the same way to artistic outputs, however, simply because artistic evaluations are always subjective—there is no final court in which artistic value can be finally determined. In scientific pursuits outputs are conceptual, and this marks a fundamental difference between the processes of scientific and artistic creativity. A scientific discovery must be conceptualised in order to be communicated to others as a scientific discovery—it is a 'knowing that'; but artistic output is in the form of some product which is the result of a 'knowing how'. Of course, there may be a consensus about the value of some artistic products, but there is no way to distinguish between genuine evaluation (whatever that might be) and mere fashion. For instance, Shakespeare, Mozart, and Picasso are widely accepted to be highly creative by at least some people who have little experience of the artistic output of those artists, or of the output of other artists to use as a comparison.

It might be argued that an appeal to expert opinion would resolve the issue, but that has its own complications. Artistic innovations are often vehemently rejected by contemporary experts—and later consensus about their value can as easily be attributed to a process of discourse by which the expert community agrees to read artistic texts (whether the output of visual artists, literature, musical performances, and so on) in a particular way. Boden herself allows many reputations for H-creativity are built on cultural factors. She sketches an argument by G. Taylor (1990) to the effect that Shakespeare was no better writer than some of his contemporaries and

that Shakespeare's reputation is due to cultural factors and a kind of snowball effect. Because Shakespeare wrote most of his plays for the Globe Theatre, there was a commercial incentive for the theatre to publish a folio of his works, an incentive which was absent in the case of his contemporary Thomas Middleton. Shakespeare's plays were therefore more widely disseminated and more likely to be preserved for posterity in libraries. The licensing-act of 1737 resulted in a reduction in the number of new theatrical productions, so that Shakespeare's plays were kept before the public eye. The cult of Shakespeare has (among other cultural effects) encouraged tourism and promoted academic careers, and as a result the cult is encouraged by people in powerful positions, to the point where it makes sense to speak of a 'Shakespeare industry' (Boden 1990: 45).

Analysis of artistic products by experts is not a reliable guide to evaluation of those products, therefore. Naomi Cumming summarises an argument of Justin London (1998) which cautions music theorists against the 'false abstraction, and even reification' of perceived constancies of style:

His concern, in sum, is to avoid the reification of general types of structures into items that have a theoretical life of their own, such that they might be allowed to dictate what can be perceived.

(Cumming 2000: 314)

The problem with treating any abstraction which analysis of a musical work provides as an account of its generative rules is that validation of both a given way of reading a text such as a musical composition (Schenkerian analysis of a Beethoven symphony or participant discourse about a death metal track) and the texts to which it is applied, is circular. The way of reading is validated because it finds particular properties in certain texts, and the texts are validated because the way of reading finds those properties in them. The problem of reification of any given abstraction is that it can blind those who apply it to other readings which conflict with it, or which do not conflict but are simply not included in it. If a reified way of reading is applied, works which alter, transcend, or otherwise simply do not fit an existing framework of concepts will be judged as a poor works, a failure of creativity. At work in the rejection of new artistic ideas, as Boden remarks, is

a temperamental and/or socially comfortable unadventurousness. But it is due also to the difficulty (at least for adult minds) of making truly fundamental conceptual shifts.

(Boden 1990: 74)

This danger is most insidious when the way of reading appears appropriate to the text to which it is applied, and glaringly obvious when applied to a text from a very different style. Schenkerian analysis applied to a death metal song will show that song to be lacking in artistic value; and the academy-trained musicologist who applies it (if they are not also an ethnomusicologist) will be likely to dismiss both the alleged expertise of the death metal analyst

and the artistic value they find in the song. An example of my own personal experience can serve to illustrate this point. After formal training in the techniques and values of classical music piano performance from six years of age to postgraduate level, I had great difficulty in coming to appreciate the aesthetic values of various kinds of popular and rock music. It required some years of exposure to a wide range of works and discourse in the form of reading and contact with fans for me to feel at home with popular music (and this process is still continuing).

To find an expert group to decide artistic value, then, we need to look for a group which likes the text in question (and presumably who can talk knowledgeably about it). That is to say: to find whether a musical text has value, we must ask those who will say that it does have value (and why).

Perhaps the ability to talk knowledgeably about the artistic text can help us to validate the opinion of those who value the text in question. Mere liking, or even passionate fervour, will not do: it must be combined with an ability to justify the liking with an articulate account of the reasons for the value. In fact, this has been an issue within the discipline of popular music studies. As the inappropriateness to popular music of the musical discourse of the classical academy has become apparent, popular music researchers have sought other criteria by which to determine the worth of popular music texts. An alternative was to study artists and works with the most popular acclaim—however, without appropriate musicological tools, this approach tended to sociological analysis rather than artistic analysis and evaluation. Writings such as Simon Frith's (1996) 'Performing Rites: Evaluating Popular Music' are an attempt to rectify the situation.

But if knowledgeable talk is a criterion for valid evaluation, what kinds of reasons will we accept? Must the expert be able to construct a complex edifice of academic argument? Is passionate fervour an indication of more value than cool liking? There is an implicit process of artistic judgement in our acceptance or rejection of any such attempt at justification. To validate the justification of artistic value, we must make explicit what we will accept—and constructs of what constitutes a reliable justification for an evaluation of musical creativity are vulnerable to the same argument of circular validation as are the justifications themselves. Musical discourse may be a worthwhile activity but it is not a reliable arena for evaluations of musical creativity.

What then is the status as the product of an act of creativity of a musical work which is valued by its creator but rejected by all others? And what is the status as the product of an act of creativity of a musical work which its creator dismisses as of poor quality but which others judge as being of high value? Perhaps a particular musician sincerely evaluates all their output as being deeply creative. If neither consensus (whether expert or popular) nor expert argument can be relied on as the final arbiter of creative value, all musical outputs are in the same position with respect to evaluation of creativity: only the creator's opinion counts. But we are unlikely to accept that the musician-creator's belief in the value of their output—no matter how sincerely held—is a reliable indicator of creative value. If we reject the creator's evaluation of their own work as unreliable then it makes no difference whether their evaluation is positive or

negative; so the musical output (composition, performance, or recording) which its creator thinks is poor quality is as much a candidate for creative value (as far as evaluation goes) as those which they evaluate highly.

Perhaps this seems like a quibble—after all, misevaluations also occur with regard to scientific discoveries. Arthur Koestler (1975) gives the case of Ignaz Semmelweis, who discovered how to prevent puerperal fever by washing the hands in disinfectant before attending the mothers—yet his discovery was rejected by the medical profession of the time and he was exiled and finally driven mad by the rejection (Boden 1990: 271). Yet there is a general acceptance of at least some scientific discoveries as being genuine advances in knowledge. Evaluation may be imperfect but it works well enough to be useful. However, scientific knowledge is different from artistic meaning in that its context is more clearly defined. Scientific knowledge fits into a 'space of reasons' of publicly agreed conceptual knowledge and a newly-discovered proposition within a scientific discipline such as physics or mathematics—even if it can not always be proven absolutely—can at least be shown to have some predictive value. '[T]he scientist's [...] verification involves experimental methods specifically designed to achieve universal agreement', even if these involve 'not just a single definitive test' but 'many different, and partially conflicting criteria' (Boden 1990: 75). Although scientific discoveries which transcend existing conceptual frameworks may (like radically new musical works) be initially dismissed, still the predictions which a scientific discovery makes may eventually be confirmed or disconfirmed. Scientific knowledge is required to fit the world but musical meaning is not:

Music, I will argue, creates its own context of reference and meaning, within the sonic texture of a given work. (The situation is more complex than this: musical works may utilise publicly available concepts in a variety of ways, including making reference to extramusical objects and ideas. My argument is that music's defining characteristic—what distinguishes it from other human activities which make such references—is the meaning created through relationships between different sound events, which in itself does not entail extramusical reference.) While there are many publicly established concepts relating to relationships between sound events (including concepts involving pitch relations such as perfect cadence, scale degrees, melodic intervals; concepts of metre and rhythm; and higher level concepts of musical styles and so on) I will argue strongly that even music which embodies such concepts also embodies nonconceptual content. Music is a means by which nonconceptual content can both be explored and made public.

This, then, is the difficulty with the notion of H-creativity in musical creation. Since it is not an essential characteristic of music that it should fit the world, it cannot be tested for correctness in the way a scientific discovery can. A given musical work may fit into an existing framework of concepts which allows a judgement of H-creativity to be made—as, for instance, Arnold Schoenberg's twelve-tone system fitted into a framework of concepts about musical tonality, while transcending some of that framework's established concepts (the concept of 'perfect

cadence' has no place in the new system) and adding some historically new concepts. Tonality, it could be argued,

has "real" power in directing the compositional practices of the common-practice period, insofar as it is evident as a driving force within them, and a broad consensus may be reached on its more central attributes (or "rules"), so that basic descriptions at least can be judged fairly as "right" or "wrong." Chord labels, in most Classical cases, would be "decidable."

(Cumming 2000: 338)

This is hardly surprising: composers of the period were explicitly trained in tonality and worked within a musical discourse where basic concepts of tonality such as 'major', 'minor', 'key' and 'cadence' were made verbally explicit (think of key signatures, and titles such as Beethoven's 'Sonata in F Minor' Op.2 No. 1). In the case of musical tonality, some shared generative rules for a style can be unambiguously identified. This is only a problem if the same certainty is extended to abstractions which an analyst finds by induction, or when those abstractions which have been made explicit are assumed to constitute the whole import of the work.

There is a misapprehension which is implicit in Boden's argument about H-creativity in the arts. It is generally accepted, as Boden says, that 'the progression from Renaissance music to the wilder reaches of Schoenberg is intelligible as a journey through [the space of the musical scale]' (1990: 61); but it is not true that the creativity of works within the classical music tradition included in this journey should be measured in terms of the contribution they made to the progress of tonality towards atonality. Individual works might conceivably make little or no contribution to the exploration of the space of the scale, and yet be highly creative in ways not captured by that framework of concepts. Similarly, Boden appears willing to reduce Charles Dickens's creativity in describing Ebenezer Scrooge as 'a squeezing, wrenching, grasping, scraping, clutching, covetous old sinner' (Boden 1990: 61) to the fact of his probably being the first in the English language to use seven adjectives in a row and ignoring, for instance, the musical progression of vowel sounds through the phrase. Probably this is unjust and she would readily admit that there is more to Dickens's writing than exploration of the space of English grammar—but it is precisely because some aspects of artistic creation are more easily conceptualised and talked about that they become valorised, while aspects which are more difficult to describe in words tend to be left out of artistic discourse.

On the other hand, a musical work conceivably might not fit into any existing framework of concepts created through discourse about music, and in this case no framework exists within which to assess the creative value of the work—it might be a radically new work of genius, a work with almost nothing to offer artistically, or it might fall somewhere between these two extremes. The two notions of evaluation (whether the product of creation is valuable) and newness (whether it is H-creative) seem dependent on one another in a way which makes both undecidable.

The problem with evaluation of artistic works which do not function according to existing conceptual frameworks is reproduced in computer models of creativity:

In exploratory creativity [...] almost every new structure will be valuable if the programmer [...] has defined the space, and the rules for exploring it, adequately. In that sense, evaluation is built into the system's generative processes. But transformational creativity, by definition, flouts some of the accepted rules. There is therefore no escape from *post hoc* evaluation, to decide whether the novel idea is worth while and perhaps worth developing. Since seeding future values is even harder than identifying those we've got already, that evaluation typically has to be done by people, not programs.

(Boden 1990: 320)

Boden admits that a program which could revise its own aesthetic values is a long way off.

What, then, of musical P-creativity? If creativity is defined as producing something (idea or artefact) which is 'new, surprising, and valuable' (Boden 1990: 1), and judgements of newness and value are at least uncertain, how can we determine whether something is P-creative? Where a judgement of H-creativity is absent we cannot—and this applies to the realm of scientific creativity (where H-creativity can be measured by how well an idea fits existing data and predicts new data) as well as to musical creativity (where I have argued these criteria do not apply). If a precocious child mathematician were to independently rediscover some established mathematical formula, that would be accounted P-creativity without H-creativity. But without knowledge of the corresponding H-creative discovery there is no benchmark by which we can say they were creative at all. If there is no previous H-discovery to act as a benchmark then the child's discovery will either be judged as H-creative in itself, or a judgement of the discovery's value together with the child's report of whether it was a 'new' and 'surprising' discovery will have to suffice for a judgement of P-creativity. The creator's subjective experience of surprise may not be reliable, however—it is conceivable that the discovery may just appear self-evident to the creator and not surprising at all; perhaps it is a step which they rely on in a larger calculation and are hardly aware of having made. In practice, however, it is hard to imagine any P-discovery in the discipline of mathematics that would not also be either H-creative or a duplication of a previous H-creative discovery. Judgements of P-creativity rely on verification (however imperfect a process it may be) as much as judgements of H-creativity do.

In the case of musical creativity, I have argued that it is not possible to reliably apply either judgements of H-creativity, judgements of value, or judgements of newness to a particular act of creation (composition or performance). If creativity means to produce something new, surprising and valuable, then the only remaining criterion is that of surprise—and the same argument applies to musical creativity as to scientific discovery, that the creation may or may not appear surprising to the creator, who, as far as they are aware of having made it, may consider it self-evident.

The point of this extended argument about H-creativity and P-creativity is not to argue musical P-creativity out of existence, but simply to demonstrate the intangibility of the concept. Boden's definition of creativity, or something like it is widely accepted in the literature. I hope my argument shows that a too rigid application of the criteria of newness, surprise, and value will distort the picture we can obtain of musical creativity. That creativity occurs in music is not in dispute—as Boden (1990: 40) remarks of creativity in general, we believe in it because we encounter it in practice. Thus:

We often recognize originality 'intuitively', without being able to state the previous rules and/or the way in which the new idea departs from them. Even literary critics and art-historians cannot explicitly describe every aspect of a given style. But people who sense the creativity in post-Impressionist painting, atonal music, or punk rock, do not have any magical insight into the aesthetics of the original. Rather, they have a general ability to recognize and compare all sorts of pattern [...]

(Boden 1990: 52)

In fact I accept Boden's definition of P-creativity as a working definition; it is only that I doubt its usefulness as a litmus test for individual cases of creativity.

My thesis—rather than attempting a general theory of creativity—is about what happens when a particular kind of creativity occurs: that is musical creativity that occurs in the performance of an already established musical text. Although all music certainly deals in concepts, I shall argue that nonconceptual perceptual content is essential to its fundamental nature. Each of the four phases of creativity which Boden (1990: 29) lists—preparation, incubation, illumination, and verification or (for artistic products) evaluation—can be identified in the process of generating new material in rehearsal. The bands I interviewed described the process of working up new material as an iterative process of experimentation, recording, forgetting, and working out again. Within this process, it can be assumed that they explore possibilities in relation to the initial fragments around which a song coalesces: this is preparation. Incubation presumably occurs in the intervals between rehearsals, particularly when a riff is only half-recalled and a slightly different version is reconstructed from memory. 'Illumination' occurs at intervals when individual members or the band as a whole find something that works; and working-out or evaluation is part of the whole process, which finishes in a song which is an established text.

However, for the moment of creativity in performance which is the particular focus of my thesis, only the first three can be readily identified. It is important to realise that, like many rock bands, the artists I interviewed perform songs as established texts with little or no changes made in performance—they do not improvise, and tempo and dynamics (changes in loudness) are more or less set. However, the moment of creativity which is the focus of this thesis happens in performance, in the context of these established musical texts. Here again, phases of preparation, incubation and illumination can be readily hypothesised. Preparation and incubation occur respectively in and between rehearsals. The moment of illumination, however, must occur in performance—it is possible for musicians to give an uninspired performance,

even when rehearsals have been inspired. In fact, in the 'motor creativity' model I propose, 'illumination' and performance are not only simultaneous, but are in fact the same thing. It follows that 'evaluation' is excluded from that particular act of creation, where the created musical idea is available to the audience in the moment of creation. Of course, that does not preclude later evaluation which is fed into future performances. However, the physical production of unplanned, successful musical ideas in the course of performance, by definition escapes evaluation.

2.3 Summary

In this chapter I have reviewed Margaret Boden's computational theories of creativity. I have argued that musical creativity cannot be adequately explained in terms of underlying generative rules, due to the propensity to treat existing works as paradigms, rather than abstracted models. I have argued that evaluation of musical creations and the notion of H-creativity in music are mutually dependent in a way which means that reliable decisions cannot be guaranteed for either. P-creativity is also not susceptible of reliable identification in music, but is nevertheless a useful notion.

3 Semiotic approaches to music

3.1 Introduction

This chapter reviews features of Naomi Cumming's (2000) systematic application of C.S. Peirce's semiotics to music performance and listening, and uses Cumming's ideas as a framework to introduce and critique those of other authors.

I co-opt arguments from Cumming in order to reinforce my argument for musical paradigms and against definable generative rules as underpinning musical works. I draw parallels between what Cumming calls the 'implicit beliefs' of a performer, Margaret Boden's conceptual spaces, and the schemas of habitual perceptual, emotional and motor responses which Shaun Gallagher identified as constraining intentionality.

I examine some components of musical meaning which have received attention in the literature (particularly the concept of musical gesture) in order to delineate the particular focus of my thesis. This does not amount to a rejection of ideas not pursued in my thesis (on the contrary) but rather gives an indication of the emphasis that different authors have accorded these ideas, while giving little space to complementary components of musical meaning. Chief among the unduly ignored components of musical meaning (and central to my thesis) is that of congeneric meaning. Accordingly, in the final section of the chapter I review and critique Wilson Coker's (1972) 'Music in Meaning', in which the notion of congeneric iconic meaning is treated as indispensable to music. I find that Coker emphasis is on the referential function of iconic signs (likeness is used to indicate reference), whereas I want to emphasise the abstraction of likeness between signs (reference indicates where to look for likeness).

3.2 Naomi Cumming and musical subjectivity

In David Lidov's foreword to Naomi Cumming's 'The Sonic Self' he notes that Cumming pays detailed attention to musical intuition, 'with a Kantian and Peircian understanding that all perception is interpreted' and the corollary that there should be 'no discontinuity between sensuous and formal listening, between individual and social interpretation' (Cumming 2000: xvii). Although the focus of my thesis is different from that of Cumming's book—she is concerned largely with the perception of violin tone in terms of the human voice—the idea that perception is interpreted is central to the theory of congeneric iconic signification which I expound, while the relativity of meaning which is implicit in the recognition of perception as interpreted finds expression in my argument for the polysemy of music.

Cumming's philosophy of music performance is 'semiotic', by which she means

that it presents sounds not merely as acoustic phenomena, but as capable of carrying connotations, for example, of human “subjective” qualities, such as those intimated in voice, gesture, or actions suggestive of willfulness.

(Cumming 2000: 16)

A philosophy of performance would need to account for the fascination of abstract forms, their felicitous possibility of being used as a means of withdrawal into a separate “world,” away from expressive demands[...] the philosophy would also need to account for how musical sounds are socially located, evaluated, and controlled.

(Cumming 2000: 14)

Thus, she ‘takes seriously the “understanding” involved in kinesthetic activity, as well as that found in more abstract forms of pattern recognition’ (Cumming 2000: 16).

Robert Hatten’s afterword to Cumming’s book remarks that, for the arts, everything is ‘emic’, that is to say that every aspect of an artistic work carries meaning and none is purely ‘etic’ or varying without signifying. Hatten notes that Cumming has ‘found a principled place for all kinds of meaning in a semiotic theory based on Peirce’s sign types’—including both the quality of sound which is her focus and the role of form and structure which is the traditional sphere of music analysis (Cumming 2000: 307). This is something I have not attempted: my thesis is neither a systematic application of Peirce’s scheme of semiotics to music, nor an attempt to account for all the different ways in which music can mean, but instead focuses on a single mechanism of musical meaning, at the level of perception without extramusical reference. In doing this, I lose the advantage which Cumming’s approach has, of ‘not forcing any unwarranted separations between the “psychological,” as a set of private feelings or states, and the “culturally conditioned,” “social,” or “historical”’ (Cumming 2000: 17).

I am well aware that in this thesis I have effected just such an artificial separation of processes of meaning which in practice interact and influence each other; the advantage I gain is a deeper investigation of the mechanics of one process. It may be that a clearer understanding of the perceptual level of music listening will at a later date prove useful in working out the interaction and mutual influence of different processes of musical meaning, but I do not pursue those processes or their interaction in my argument. Part of the purpose of this chapter, then, is to identify the different ways that music can create or carry meaning but which are not the subject matter of my thesis, the better to clarify where in a holistic theory of musical meaning my present argument would be situated.

3.2.1 Subjective listening

One of the many strengths of Cumming’s ‘The Sonic Self’ is her rehabilitation of subjectivity in music listening as a valid response, an attitude which resonates with my argument for polysemy in this thesis. Her Chapter 2 (Cumming 2000: 43ff) begins with a section on ‘The Uncertainties of Musical Signification’ where she argues that a clear distinction between reports

of the sensory qualities of music (which rely on the 'sensitivity or feeling state' of the listener) and descriptions of conceptual interpretations cannot be justified, because 'the discrimination of sounds and their signification' which is required for conceptual interpretation 'demands the acquisition of habits in perceiving which are themselves evidence of learning' (2000: 47). The mention of 'habits of perceiving' endorses my notion of what I am calling 'sedimented perception'. In addition, Cumming's reasoning shows the root of circularity in the validation of musical texts through a given way of reading and the validation of the way of reading through a canon of accepted musical texts. It is that the habit of listening in a certain way can blind the listener to alternative readings of even those texts which the way of listening evaluates positively. Perceptions are the premises of any argument in support of an evaluative judgement of a musical work and those perceptions are, as Gallagher says, 'constrained by contents stored on the backstage of intentionality' (1998: 106); they are determined by what he calls 'pre-noetic' factors.

Of course, perceptions can come to change over a period of time in much the same way as they were initially formed, through a process of discourse within a linguistic community. Certainly something like this happened in my own case with my growing appreciation of rock music: I gradually set aside the perceptions and values I had learned in a classical music conservatorium in favour of newly-learned perceptions and values which I learned—at least in part—from the discourse of listeners, writers, participants and academics in the popular music field.

My argument that discourse is however not the sole agent of change of how an individual perceives musical events is twofold. First, it is a logical impossibility that new musical styles can be appreciated on their own terms when they effect a transformation of the existing conceptual space, without a revision of the listener's perceptual habits taking place—and this revision cannot be due to discourse since no discourse yet exists for the new style. And yet new kinds of music do arise, as do the new ways of perceiving that their appreciation entails. The computer models examined by Boden illuminate this aspect of the process of creativity by their very failure to successfully revise their own inbuilt aesthetic values. As Boden notes, the changed aesthetic values of future products of transformational creativity cannot be built into the generative rules of a computer program in advance, while the program which can revise its own aesthetic values is 'a long way off' (1990: 321).

My second argument for the existence of a process other than discourse accounting for a revision of sedimented perceptions relates to the notion (advanced in Chapter 1) of a recognised musical style acting as a paradigm which is susceptible of abstraction in potentially many different ways. I have argued that no set of generative rules can account for all of the musical outputs which are classified within a single style. Indeed, it is difficult or impossible to draw clear stylistic lines between one style and its historical successor, and that difficulty undermines the project of accounting for any style with a set of generative rules. As Cumming summarises Eugene Narmour's position in 'Beyond Schenkerism' (1977):

If a theory is selective in the features of experience it chooses to codify, and if it is also unable to account for historical changes in patterning (imposing a set grid of stylistic patterns on changing styles), how can it make claims that its rules are "real," and independently operative set of stylistic proclivities?

(Cumming 2000: 313)

Each individual work is, to some degree, not only an exemplar of a broad historical style and of the characteristic style of its composer, but an also embodiment of a style *sui generis* which it creates. Now, it is conceivable at this point in my argument that the unique style of an individual work could, at least in principle, be codified conceptually. However, I will argue that nonconceptual perception by musical listeners is an essential and characteristic component of the musical experience, precisely because it offers the opportunity for the creation of unsedimented perceptual abstractions by the listener.

3.2.2 Individual style in performance

Much of 'The Sonic Self' is concerned with the issue of personal identity, as it is simultaneously constructed and expressed in the form of a personal style of musical performance:

Identity cannot be located in some "inner" space, which is known through introspection alone.[...] Rather, "selfhood" is an intrinsically social, interactive, and mobile experience. "Subjects" are formed by participation in the social media of gesture, language, or music – media that provide a repertoire of possible choices – within which they achieve their personal "style."

(Cumming 2000: 10)

Style can be defined as

a replication of patterning, whether in human behavior or in the artifacts produced by human behavior, that results from a series of choices made within some set of constraints.

(Meyer 1989: 4; quoted in Cumming 2000: 325)

Something which Cumming might have emphasised here in relation to the notion of perception as interpretation is that the individual subject is formed at the juncture of choice not only in the choice made but in what is recognized as an opportunity for choice. The 'replication of patterning' in choices made indicates that within a recognizable style, similar choices are made in similar (musical) situations. To explicate this requires a more detailed exposition of Hatten's idea that everything in music is 'emic'.

The phonemic aspects of a language are the 'invariant oppositional features' which discriminate meaning, as opposed to the purely phonetic aspects of a language which may vary without affecting meaning. Hatten asserts that:

Analogous relationships between invariant and variable features exist for any defined units of a code, but composers and listeners can generate types out of the variable features of a token and categorize singularities that do not require conceptual labels.

(Robert Hatten, in Cumming 2000: 336)

In a language, there are aspects of the material sign—the word as it is spoken—which can vary without affecting the meaning. The sound as a whole is a vehicle for those aspects which must be controlled in order to convey meaning. In music, on the other hand and according to Hatten, features which are variable (etic) with respect to one code (the code of pitch function in tonal music, for instance) are available to act as invariants (emic features) of another code (such as, for example, a code of timbral qualities). That Hatten sees this second code as individually created rather than pre-existing and public (in the way of tonal relationships of the common practice period of classical music) is indicated by his description of composers and listeners as 'generating' types out of the variable features of a token and actively categorizing singularities without the necessity of conceptualisation.

Hatten's statement about composers and listeners (and he might have added, performers) is close to a high-level generalisation of the process which I investigate in detail in this thesis. If I were to formulate an equivalent high-level generalisation of my own view, it would differ in some minor detail from Hatten's statement. Hatten seems to see the features which are etic or 'leftover' with respect to the emic aspect of a particular code as being the only ones available with which to construct a second code. I see features, such as for example pitch, as being able to simultaneously participate in a code of tonal relationships with respect to key and a second code of motivic shape.

The replication of patterning which, according to Meyer, constitutes a style can be assumed to utilise the variable features of a code in order to construct a second code. Where the style is an individual performance style, precisely what types are generated will be to some degree a matter of idiosyncratic choice. Meyer's formulation as it is given above might have suggested that two performers construct their individual styles by making different choices from the same possibilities offered at identical junctures in the performance of the same work. If, however, they can construct a new, nonconceptualised code from the variable features of the defined codes of the piece then the very possibilities, and the points within the work whether they find them, are potentially different for different performers. (It should be added that the 'defined codes' for a classical music work will include not only tonal pitch relationships but also codes which are specific to the style of the period and the particular composer and which must be given appropriate expression in performance.)

When it comes to making these choices, Cumming asks:

What is the ideology which governs me? What is the domain of my choice? How free am I?

(Cumming 2000: 11)

It is at this point that a theory of creativity becomes relevant. Assuming a performer is competent within the style of a given composer, their performance of a work by the composer will be governed at least in part by an explicit or implicit set of the generative rules by which an appropriate performance style is produced. A performer's individual interpretation of the work might conceivably be constructed via a secondary code from the 'etic' aspects of the appropriate performance style. On the other hand, the performer's individual style in interpreting the composer might involve a transformation of the 'emic' aspects of the style, such that the resulting performance will be accepted as an exemplar of the existing paradigm for stylistic performance of the composer, without sharing the same set of generative rules. In either case, creativity occurs. Cumming emphasises the force of explicit and implicit beliefs and ideologies on the choices a performer can make. Implicit 'beliefs' are unarticulated and socially enforced, they are

[...] relatively stable but informal views, held by an individual or social group, of how some aspect of experience is, or ought to be, organized. Whether the construction of socially normative behavior is made conscious and articulate or not, it can be said to exist in the mind of an individual if it acts to inhibit is or her range of behavior. One notable aspect of the beliefs I have been mentioning is that they carry an evaluative weighting.

(Cumming 2000: 12)

This is very close to Boden's description of conceptual spaces:

Conceptual spaces are structured styles of thought. They are normally picked up from one's own culture or peer group, but are occasionally borrowed from other cultures. In either case, they are already there: They aren't originated by one individual mind. [They are} any disciplined way of thinking that is familiar to (and valued by) a certain group.

(Boden 1990: 4)

The value which attaches to unarticulated beliefs or conceptual spaces can (as noted in the previous chapter) lead to conflict when two incompatible conceptual spaces are activated. Cumming herself, for instance, found a conflict between her British socialization of restricted expressivity and the articulate beliefs she held about French Romantic violin style. While making the conflict explicit to herself allowed her the choice of setting aside the learnt inhibition of her culture and entering a new sound world, it was not an immediate entry, since 'habits of expression are not simply undone' (Cumming 2000: 11). Here we have an echo of Gallagher's 'schemas which organize intentional experience', which may be 'practical (schemas of developed skills and practical habits) or emotional (based on both idiosyncratic and cultural

patterns), or normative' (Gallagher 1998: 150). Styles of thought are structured not only by concepts (whether explicitly or implicitly held) but also by skills and habits of emotional and motor responses.

3.3 Musical gesture

3.3.1 What are gestures?

Throughout her book, Cumming's recurring focus is on gesture and instrumental sound quality in musical performance as indices of human emotion. While I do not take issue with her arguments, my own argument relates to the illumination of abstract patterns (of melody, timbre, rhythm, and so on) in performance. The perception of patterning of music elements is certainly imbricated with an indexical response to gesture (we cannot hear a drum stroke as being loud, for example, without also responding to it as a human gesture) but this is not the concern of my thesis. Rather, I am concerned with the potential in the performance of any established musical text (that is, a notated work or one where what is to be played has been stabilised through a process of working out and repetition) for small changes of timing, loudness and timbre to mold perceptions of likeness between different abstract patterns. It is important to keep this distinction in mind during this section, which aims simply to give a sketch of Cumming's ideas regarding musical gesture and to situate those with regard to the literature on the topic which has appeared since 'The Sonic Self' was published.

The notion of gesture in music is central to both Cumming's approach in 'The Sonic Self' and to Wilson Coker's 'Music and Meaning'. Gestures, Cumming says, are the result of a 'unitary impulse of some kind' (2000: 136). The term 'gesture'

captures the propensity of listeners to hear in short, directed motions the evidence of a sometimes expressive agency in movement.

(Cumming 2000: 165)

David Lidov's definition is similar. Gesture, in its general sense, encompasses

all brief, expressive molar units of motor activity, be they of the limbs, the larynx, the torso, etcetera, units which are whole but not readily subdivisible

(Lidov 1987: 77; quoted in Cumming 2000: 138)

Motor aspects of that impulse can be perceived directly in the sound:

When an element of music is heard as expressively “gestural,” it suggests the kind of “energy” or directionality commonly linked with an expressive gesture in a person or animal, without the aid of visual cues[...] The direction, force, and timing of a movement (transformed into musical terms) is now the most important aspect of the “icon.” It is not so much the *appearance* of the gesture that is informative [...] as it is the variable attributes of apparent energy and control. It is because the varying qualities of motion do not depend on a visual presentation in order to be recognized that they can be musically presented and transformed in such an effective way. [...] The energy and directedness of an index is not lost, though they form part of a unit which, as a whole, becomes the aural icon of a possible affective state.

(Cumming 2000: 92)

Cumming’s use of the term ‘icon’ here should not mislead: she simply means that the sound of gesture in music is an icon of the sound of a human gesture made in a nonmusical context. In fact, Cumming is careful to argue that the indexical meaning of gestures—the immediate sense of energy and directionality we have from them—is retained within melodic patterns (which can be seen as abstract and iconic) and imbues them with an affective force they might otherwise lack (2000: 134). The gestural potential of a particular melodic pattern can only be realised in performance, and a given pattern can be given different gestural interpretations within a constrained range—just as different kinds of gesture may be realised within the performance of different melodic patterns (Cumming 2000: 136).

For Coker, the expressivity of music stems from the instinctual gestures of voice and movement (1972: 148), which musical gestures represent (ibid: 159). Musical gestures (at least at this level) cannot represent actual actions and their real-world objects, but only the ‘attitude’ of the action. Thus, in the Stravinsky ballet ‘Orpheus’, stage directions requiring the Bacchantes to seize Orpheus and tear him to pieces do not in fact seize or tear anyone to pieces, but the attitude of the music is ‘unmistakably antagonistic and emotional, signalling attack’ (ibid: 163):

[N]ot one Bacchante nor Orpheus is represented. Only the angry gestures of the Bacchantes are given in the analogue of sonorous motion. We might say that only the verbs, only the actions, are implicit in the musical gestures, along with the pervasive attitude of anger.

(Coker 1972: 164)

What is important for both Cumming and Coker about gesture is the prereflective immediacy of response. Gesture, Coker writes, ‘arises at the most rudimentary level of biological behavior’ (1972: 10), and such an instinctively arising gesture by one member of the species is triggers adjustive behavior in another:

One adjusts himself quickly, instinctively, and without thought to the attitude of the other.

(Coker 1972: 11)

If a Peircean index is a sign which is 'really affected by its object' (Cumming 2000: 89), then how can indices be said to operate in non-texted instrumental music, which 'does not "point at" anything in particular' (ibid: 90)—that is, where the object of reference is indeterminate? Cumming recounts Peirce's own experience of being shocked out of a state of inertia by the sudden change in pitch (due to the Döpler effect) of a passing train. If recorded (at which point it becomes an icon of the original sign, in Cumming's reckoning), such a sound retains (at least some of) its power to confront and warn hearers, and to index the apparent speed and proximity of a passing train. Similarly, a human shriek recorded and played back will continue to function as an index of pain and distress, even though our ability to hear it as an instance of recorded sound allows us to distance ourselves from our involuntary responses.

Physiological changes are accepted as part of the etiology of at least some emotions, observable not only in the altered sound of a voice, but in characteristic changes of movement and activity, as well as the flow of thought.

(Cumming 2000: 91-92)

Cumming is arguing here that the object of reference of musical gesture is the affect which shapes it. Manfred Clynes was an early investigator of the consistent appearance of certain patterns of movements with particular emotions. Clynes studied the variation in physiological actions within a limited timespace of no more than a few seconds and found that gestures could be classified by overall length and trajectories of direction and force, and hypothesised that they were neurophysiologically encoded to express basic affective states and were invariant across cultures (Cumming 2000: 139-40). One interesting consequence of Clynes's theory of the universality of gestural meaning is that the form of an individual gesture can be enacted with more or less precision. Similarly, Wilson Coker asserts that types of motion are found in music which are 'universals' and cross-sensory, and which are 'intuitively recognizable properties of gestures' (1972: 155). In support of the universality of gestures within a species, Cumming (2000: 141) notes Konrad Lorenz's observation that natural selection tends to preserve those kinds of signaling movements that most unambiguously convey information to another member of the species.

Cumming notes that music aesthetician Peter Kivy accepts that emotions can be read from the sound produced by motor gestures, and quotes Stephen Davies:

[E]motions are heard in music as belonging to it, just as appearances of emotions are present in the bearing, gait, or deportment of our fellow human beings and other creatures[.]

(Davies 1994: 239; quoted in Cumming 2000: 198)

For Cumming, then, what distinguishes music from purely linguistic utterance is

its use of signs (in timbre, or inflection) which are directly connected to bodily states, and cannot be dissolved into a play of pure differences in a manner appropriate to conventional linguistic terms.

(Cumming 2000: 162)

A subjectivity becomes apparent in the succession and interplay of gestural signs—not the subjectivity of the performer or composer but the subjectivity of the 'figural subject' of the work itself. Wilson Coker's notion of the musical work as an 'aesthetic organism' (1972: 42) is not very distant from the idea of the figural subject:

[M]usical works are, strictly speaking, vehicles which we regard by a root metaphor as organisms.

(Coker 1972: 185)

3.3.2 Thomas Turino: semantic arrest

The idea that we respond to musical works as we do to organisms is one that Thomas Turino might find appealing. Turino (1999: 234) notes that the subtle rhythmic patterns of our speech and everyday motor actions, including the way we dance and play music, are shared between members of a social group, and that familiarity with these patterns enables us to differentiate between insiders and outsiders of the group through the experience of relative comfort or discomfort in their presence.

In C. S. Peirce's (1955) sign typology, associations of the kind identified by Turino are examples of the 'index', a sign which is 'physically connected' with its object, referring to it in that it is actually affected by the object. A blooming complexion is an index of good health; a crumpled wing on a car is an index of an accident. In music, the sound of an instrument is an index of someone playing the instrument (even if it is a recording, the instrument was played to make the recording). Sounds in general are indices of the physical objects and the processes involved in making the sound. An important and basic index in song is the association of the human voice with the presence of a person (woman, man, child).

Turino develops the notion of indexical polysemy in music, what he calls 'semantic snowballing'. He argues that music is dense with elements which are potential indexes, including (but not limited to) pitch, scale type, timbre, rhythmic motion, tempo, melodic shape, meter, dynamics, and harmony: music thus has the potential to comprise many simultaneous indexical signs, all of them susceptible to semantic snowballing due to multiple associations. The associations

which create indexical signs are grounded in personal experience and so are highly context-dependent. Because of this, the same signs are more likely to be shared by people living together in a close-knit unit, which in turn increases their emotional salience. In addition, according to Peircean theory, the interpretant of any sign can serve as a new sign itself, leading to a potentially 'infinite unfolding of signs in the mind' (Turino 1999: 223).

An important part of the character of such a complex of signs, according to Turino, is its resulting density and incoherence, which prevents the identification of the felt associations at the conceptual level (1999: 235). The emotional and polysemic effect of music is therefore partly due to the halting of the semiotic chain before it reaches the level of conceptual, linguistic-based interpretants. Contributing to the unidentifiability of musical meaning is the 'ambiguous nature of indices and the fact that icons and indices are not organized in a distributional-grammatical system' (Turino 1999: 249). With the loss of definite denotational meaning comes a gain in 'connotational richness' and 'intersubjective clarity' (ibid: 176). Turino's 'semantic snowballing'—the idea of polysemy tending to an undefined final object—is similar to what Lewis Beck, in a general theory of aesthetics, termed 'semantic arrest', by which meaning in art is

peremptorily arrested because the denotations become completely indefinite, appearing only as incomplete acts of reference having direction (intention) but not specific termination.

(Beck 1944: 175)

In Turino's view, the failure of musical signs to achieve conceptual identification is due to their density of associations, which is compounded by the infinite chaining of interpretants-become-signs.

3.3.3 What kind of signs are gestures?

Cumming's and Coker's descriptions of how gestures work as indexical signs implies something more than that simply a sign which is 'really affected by its object' (Cumming 2000: 89) (Cumming gives the example of a weathercock which is really affected by the wind). Cumming's insistence on the connection of gesture to bodily states and Coker's description of instinctive adjustment in response to gesture both suggest an element of compulsion in the interpretation of the sign—more like the relationship the weathercock has to the wind as sign, than the relationship we have to the weathercock as sign.. A paragraph by Cumming makes this explicit:

The picture I am drawing of the relationship between perceptual processes and signs could perhaps be compared most fruitfully to the relationship of a programming language to the "icons" appearing on a screen. the program sits unobtrusively in the background, inaccessible to the use. What it presents, as the basic units to be grasped, are "icons." Of course, these icons are already "interpreted." They have been programmed to hold a specific place in the system and would have no "meaning" without it. [...] The icon, then, is the content of which [users] are conscious at a particular moment, enabling a quick response. If this is useful to students, it is also ecologically sensible. Organisms wishing to adapt to their environment by carrying out defensive or amorous goals do not need to be delayed by questioning the origin and veridity of their already-interpreted perceptions. A sound reads "danger" or "mate," not "auditory datum which could be associated with certain possible events, given the former experience of your species." It comes as a "sign," hearing X as Y, not just as the representation of a sound in the mind.

(Cumming 2000: 113-14)

This kind of compulsory response to particular visual perceptions is a well-established feature of various species. Milner and Goodale (1995) point out that 'it is almost axiomatic' that vision originally evolved to control motor action. Primitive creatures may have relatively visuomotor mechanisms which link a single stimulus to a specific motor output. The water beetle larva, for instance, swims towards a source of light, wherever it is, to replenish its air supply, after which it swims away from the light. More complex organisms (frogs, for example) will have a variety of behaviours, each with an environmental stimulus which is specific to it. The links between these several classes of stimuli and their particular behavioural responses have been shown to exist individually and separately—they constitute a set of modular visuomotor subsystems. This direct link to action is contrary to the conception we, as humans, have of our behaviour is mediated by an internal model of our environment, to which visual perception provides inputs (Milner and Goodale 1995: 10-11).

Some behaviours of humans are physiologically set to be triggered in response to particular perceptual inputs. The more-or-less involuntary eye-blink when some object approaches the eye is one example. Assume for the moment that humans have a physiologically-determined disposition to respond to emotion expressed in the human voice—would the response transfer to a violin tone heard as 'vocal'? It has been suggested that we do have such an involuntary rsonse and that it does transfer to instrumental music:

[...] Juslin (2001) suggests that vocal expression of emotion is processed automatically by brain modules that detect certain stimulus features [...] These modules may not differentiate between different classes of acoustic stimuli (such as vocalizations and music), but respond automatically to acoustic features that have emotional relevance.

(Bharucha, Curtis et al. 2006: 25)

Although I argue for a kind of motor creativity in this thesis, the notion of gesture as indexical sign of affect does not figure in my argument. The brief review above is designed to identify areas of investigation which (although undeniably worth pursuing in a different context than the present one) are omitted from my thesis in favour of closer attention to the notion of perceptual abstraction, viewed as a kind of iconic semiosis.

3.4 Congeneric meaning

3.4.1 Why is congeneric meaning in music important?

Coker's word 'congeneric' means 'of the same kind' and refers to the mutual reference of musical events in a work, rather than to any extramusical meaning or association. A theory of musical meaning which included only extramusical reference (rather than to connections between the sonic elements in themselves) would be contrary to our experience of music. Extramusical reference may be inescapable, but the idea that music also works in some way which is independent of or supplementary to external reference is implicitly assumed or explicitly argued in much of the literature. Even without appealing to the long-range forms of the sonata period of Western music, a description of music which ignores relationships built on the structural characteristics of sonic elements seems lacking in an essential aspect. In synchronic music, for instance—say, twenty or thirty successive repetitions of an unchanged riff in a James Brown track—one finds aspects of structure based on relationships of melody, rhythm, timbre and so on, and not dependent on their extramusical associations. The claim is not that there are no extramusical associations to be found, but that a fundamental attribute of music consists in relationships between the sonic elements of any particular musical utterance. It is the aim of this thesis to explore the nature of those relationships and their mental representation by the performer.

3.4.2 The autonomist doctrine of musical meaning

Wilson Coker asserts that the mechanisms of sensory perception must be somehow the same for all experience:

[I]t is difficult, if not absurd, to speak of the perception of art works as a unique attitude or mode of experience[.]

(Coker 1972: 24)

—but recognizes that aesthetic experience is sensory in a special sense, that it is 'immediately and directly given' (1972: 26-27). If aesthetic perception is fundamentally immanent—meaning that it does not refer to an object of signification which is external to the sensory perceptual level—it frees music from the need for an object of signification external to itself. The notion of immanent perception is crucial to my argument, and I take it up in later chapters, first via the writings of Eduard Hanslick (1986) and Susanne Langer (1953; 1969), then through Pierre Schaeffer's (1966) notion of 'reduced listening', and finally addressing the idea of observational concepts. The key to immanent perception of music for both Coker and myself is congeneric signification, meaning signification where signs and their objects (signifiers and their referents) are musical phrases. For some aestheticians, Coker's semiotic approach to music failed to account for the lack of object of the musical sign (Cumming 2000: 76); but semiosis without an external object of reference is exactly what congeneric signification allows. Nor does the recognition of extramusical reference (which Coker calls 'extrageneric' meaning) invalidate the primacy of congeneric meaning.

The reference of musical gestures is to the completion of the aesthetic acts they initiate. And the completion of the acts include resultants of two sorts, those congenerically musical – such as gestures appearing elsewhere in the work – and those resultants in the interpreters' responses. Musical gestures signify both sorts of resultants.

(Coker 1972: 151)

Thus, while Coker recognizes that a musical work

as a whole or some part of it may be interpreted as referring to - pointing to, characterising, or connected with – non-musical objects such as attitudes, thoughts, affective and conative states, physical things and events, or values and properties of such objects'

(Coker 1972: 147)

—he still adheres to the 'autonomist doctrine of the self-enclosed nature and meaning of art works' (ibid: 34) which depends on internal part-to-part relations and possibly forms the 'preponderance of meaning' in a work (ibid: 35). Coker therefore suggests that congeneric meaning may be the 'indispensable feature' of aesthetic experience (ibid: 35); in this thesis I argue that it is at least the defining feature of music.

3.4.3 Congeneric signs and reference

Coker asserts that:

Objectively [...] (A) is a sign of [...] (B) iff in fact A accompanies, follows, or refers back to B.

(Coker 1972: 2)

While I am not sure that it is possible to establish objectively the reference of iconic signs in music, I agree with the general thrust of Coker's statement as it applies to musical events. Events which accompany or follow one another in the musical texture are at least potentially signs of one another, given that they are likely to occur within the same experienced present of the listener. The case of a musical event referring back to another musical event is more complicated, and I will leave it alone.

the signification of a [...] phrase may be [...] another prior or subsequent phrase

(Coker 1972: 3)

Coker therefore refers to signs in the musical texture as 'predictive', 'retrodictive' or 'juxtadictive' (1972: 4). If signifier and object are congeneric, then the difference of kind which would mark the signifier as signifier is absent. In Cumming's example of the Australian road sign, the picture of a kangaroo is of a different kind from its object of reference, the flesh and blood animal. In contrast, Coker notes that for example none of the different appearances of the characteristic motif of the first movement of Beethoven's Fifth Symphony (the 'fate' motif) has primacy as either object or sign: successive appearances of the motif refer back to previous appearances (including the very first, at the opening of the movement) as much as earlier appearances refer forward: each appearance functions as both sign and object.

Furthermore, mutual reference applies not only between different musical phrases, but between parts and wholes of the same phrase. Since Coker's emphasis is on reference between signs, rather than on abstracted likeness, the mutual reference of parts and wholes is important because it contributes to the identity of a phrase:

The included fragment may indicate the totality and vice versa, which gives rise to earlier or later congeneric references of development.

(Coker 1972: 72)

3.4.4 Reference and likeness

For Coker, congeneric iconic signification is important because it is a way of the establishing the equality of two musical events. 'Equality' is the means by which

some kind of identity is displayed. The identity is discovered in musical equalities when we think and feel "it again" of a stimulus [...] The recognition of identities is fundamental to thinking and to mental evolution. In itself equality is the relation of being the same.

(Coker 1972: 72)

The emphasis on identity highlights an important difference which exists between Coker's notion of congeneric iconic signs and my own. With Coker, the emphasis is on reference: the reference of the icon is the point of the likeness. In my argument, the point of the sign just is the likeness between them. In the first case, the interpretant is some conception of the object of the sign; in the second case, the interpretant is some abstract quality perceived in common between signifier and object, and aspects of both signifier and object which are extraneous to this similarity are absent from the interpretant. For instance, Cumming (2000: 80) discusses the Australian road sign which warns that there might be kangaroos on the road. The signs carry a black silhouette of a kangaroo, an iconic reference to kangaroos which works because we recognize the similarity between our previous visual experiences of kangaroos (real or depicted) and our visual experience of the silhouette. Other uniform aspects of the road signs, such as their shape, background colour, and positioning on the road modify the meaning of the whole sign from one of simple reference to kangaroos to a warning of their possible presence on the road. With respect to the kangaroo silhouette as icon taken alone, however, the sign's object is the type 'kangaroo' and the interpretant is a conception of 'kangaroo', with all the attributes which that carries, including those relevant to their appearing on a road: living being, legally protected wildlife, of a size and bulk likely to cause damage to a car if hit at speed, and so on. By contrast, an iconic sign where the interpretant is not a conception of the object but a grasping of the likeness between signifier and object would not include those aspects of the sign's object in the interpretant. An example of this kind of sign can be found in linguistic analogy. To say 'We are all in the same boat', for instance, rarely refers literally to a situation where those in question are seated in a vessel floating on a body of water. Rather, we are meant to understand from the very differences between the concrete specifics of our own situation (probably on dry land) and the concrete specifics of the analogy that it is some abstract similarity that is indicated (we are all in the same situation of discomfort or danger, with the same chance of escape for all of us).

In neither of the examples given in the previous paragraph is the signifier and object congeneric. There is a difference of kind in the first example between the metal and paint sign and the flesh and fur kangaroo, and in the second example between the linguistic utterance and the hypothetical boat to which it refers. However, iconic signs can principally function either to refer to their object or to prompt an abstraction of likeness between signifier and object, whether or not they are congeneric. What is especially interesting about congeneric signs is the ambiguity which arises from the mutual dependence between these two functions. In the examples given, the complementary function is unambiguous. In the case of the linguistic analogy, there is an implicit 'As regards to *that* ...,' which precedes '... we're all in the same

boat'—reference is fixed and likeness between the present situation and the metaphor is abstracted. In the case of the road sign, the likeness is unambiguous both because the essential features of the kangaroo are included (eg. upright posture, curved tail, forepaws held up) and because cues are given that the icon is to be taken as a reference—the silhouette on a gold background in diamond shape is recognized as one of a type of road sign in Australia. By contrast, where iconic signs are congeneric, reference and likeness are ambiguous, and to some extent parasitic. For two musical phrases, do we hear each as a reference to the other because they are alike, or do we abstract likeness because they refer to each other?

This ambiguity leads Coker to equivocate between likeness and reference, or in his terms, between 'equality' and 'identity'. Each variant of a motif is 'a substitute for the original and related to it by resemblance' (Coker 1972: 83). Thus, 'resemblance' is distinguished from 'identity' (Coker 1972: 80). On the other hand,

we recognize musical identity if [...] the objects falling under one concept, musical gesture X, are in one-to-one correspondence with those objects falling under the concept, musical gesture Y.

(Coker 1972: 73)

In what does 'one-to-one correspondence' consist? According to Coker, it should be considered 'conceptually in *this or that respect* (1972: 73, italics in original)—that is, according to the likeness the two musical phrases in consideration exhibit. Iconic signification is reduced to correlation—the 'similarity of major tendencies' (Coker 1972: 75) between gestures serves to establish reference. Motivic development based in congeneric iconic signification thus becomes, for Coker, a means to the end of a formal logic in music (1972: 83).

Ultimately, I think it must be accepted that pure reference and pure abstraction of likeness are idealised poles of iconic signification, with every iconic sign partaking in some measure of both. Here arises a defining difference between the classical (Western notated art) music which Coker seeks to explicate, and rock music. In classical music, repetition is a basis for the kind of congeneric reference which is Coker's concern; but this contrasts with the 'ostinati such as many primitive and popular musics employ *ad nauseum*' (Coker 1972: 75).

Even if iconic congeneric meaning is indispensable to music, Coker recognizes the participation of Peircean indices and logical signs—music is always a 'plurality of signs at once' (Coker 1972: 61). Like Cumming, Coker sees gesture as underpinning language and communication, including music (1972: 10, 16ff) and recognizes that 'all signification [...] brings attitudes and the affective processes into play' (1972: 3) and that some affective force is part of the listener's experience at all points. Coker accepts that music is susceptible of different interpretations at different times (1972: 3-4) and that 'a musical gesture is capable of many different significations'—but does not feel that the 'basic objective significance of music' is thereby altered (1972: 18). Indeed, the idea that artistic expression is neither true nor false is 'poppycock'—although its truth is congeneric, rather than 'truth about' (Coker 1972: 137).

In contrast to Cumming's insistence on the ultimate indeterminacy of musical meaning, Coker, writing in 1972, is explicitly engaged in the search for 'a theory of musical truth' (1972: xi). Thus,

the interpretant [is not] subjective [but] a matter of objective scrutiny in the most rigorous empirical ways[.]

(Coker 1972: 2)

The notion of musical 'truth' goes hand in hand with the idea of musical 'communication': the composer has a truth which they communicate to the audience. If a truth is to be communicated, openness of interpretation is to be avoided.

[A]t a linguistic level of conduct, the composer employs musical gestures and attitudes voluntarily in order to affect interpreters in the same way he himself has been affected. And in that case the musical gestures become potential linguistic symbols. The listener or the performer, if his viewpoint also is self-conscious, may be expected to grasp the symbolic use of the musical gestures [...]

(Coker 1972: 150)

Broadly, Coker argues that gestures are indices which introduce emotion into the musical listening experience. Congeneric iconic signification correlates gesture with gesture, and parts with wholes and wholes with parts within gestures. Iconic reference between different musical events underpins a system of formal logic in music—which however is 'inductive' rather than 'deductive'. Like Cumming, Coker (1972: 11) makes a distinction between prereflective and reflective levels of the listener's response to music:

When our responses [...] are instinctual and unself-conscious, we are behaving at a pre-linguistic level.

(Coker 1972: 149)

It is the ability to move between levels which makes communication possible from the composer through the performer to the listener. For communication to occur, the listener must experience the instinctual response to musical gestures taken as indexical signs and also take up a self-aware, reflective stance in relation to that experience:

Depending on the interpreter's point of view, the meaning to him [*sic*] of a musical gesture may be pre-linguistic or linguistic.

(Coker 1972: 151)

Thus, the 'affective' response is contrasted with the 'communicative and linguistic' response (ibid: 152):

[F]or communication to occur the cooperative exchanging of roles becomes relevant [...] a self conscious approach to the musical experience is implied if it is to be communicative [...]

(Coker 1972: 22)

In congeneric iconic signification, each variant is a 'substitute for the original and related to it by resemblance' (Coker 1972: 83). Gestures occur in 'multifarious combinations which convey a comparable variety of attitudes', but in terms of iconic sign functioning, the 'exhibition of sonic and rhythmic qualities by gestures is a *metaphoric* presentation of organic attitude' (Coker 1972: 166, italics added). Congeneric iconic signification is a mechanism of referring to the pre-linguistic experience of indexical gestures in a way which allows the referring sign to participate in a logical argument. This entails an abstraction away from the involuntary response to the gesture as index, and away from the pre-linguistic level. Coker, referring to George Herbert Mead, points out that

only when attitude and gesture reach the stage of being employed voluntarily to affect other as they affect one's self is language possible.

(Coker 1972: 11)

Through conscious awareness of musical gestures and our response to them, gestures arrive at the level of linguistic signs—although Coker is careful to distinguish the relationships of resemblance which congeneric iconic signs exhibit from the relation of convention which linguistic Peircean symbols have to their objects (ibid: 125).

The construction of an argument in music requires what Coker calls 'logical signs' (ibid: 110), that is, signs which connect or indicate the relation of other signs to each other. Thus, the ordering of phrases, their inflection, cadences and caesurae signify 'syntactical groupings' in music (ibid: 112).

A musical style involves use of signs in meaningful complexes, and those signs may become symbols in that persons familiar with the style share knowledge of the tendencies of signification by gestures within the style.

(Coker 1972: 128)

He goes on to explain just how this comes about:

[I]n conditional situations within a known style, if B follows A often enough, A leads us to expect B[.]

(Coker 1972: 130)

It is such fixed patterns of procedure by rule in composition which allow, according to Coker, for syntax and inference in music (1972: 135), although they give rise, not to a necessary logical connection but rather to 'inductive' logic (ibid: 130). The indexical meaning of gestures, experienced instinctually, provides semantic content (emotion), and the process of iconic

signification enables the composer to refer to individual gestures within the procedures which provide the possibility of logical operations.

Overall, 'Music and Meaning' is a convincing account of how music can construct a formal logic of emotion by linking indexical gestures (to which we have a definite emotional response) to logical operations by means of congeneric iconic reference. It is especially applicable to the large-scale classical works with which Coker was concerned, since the articulation of formal structure in such works requires a means of referring to phrases and sections of the work which are no longer before the ear of the listener, a requirement which iconic reference fulfils.

This may be an appropriate model for some kinds of music—or at least, it may capture some of the processes of meaning in those kinds of music. However, Coker's system of determinate indexical signs referred to unambiguously through congeneric iconic reference, which allows them to participate in a logic (albeit inductive logic), excludes the possibility of active abstraction from the iconic signs by the listener.

3.5 Summary

In this chapter I have reviewed some prominent themes in the literature on musical meaning. I began by acknowledging the strength of Naomi Cumming's approach in 'The Sonic Self', where she considers not only the different channels of meaning in music perception but also the interactions between them. I have related Cumming's 'habits of perceiving' to Shaun Gallagher's pre-noetic factors which constrain our intentionality. Similarly, I have noted the weight which Cumming accords to the enculturation of 'implicit beliefs' in constraining the choices of a music performer. I have drawn on Cumming to reinforce my argument that musical works should rather be seen as paradigmatic exemplars than as instances of any particular set of generative rules.

I have briefly explored the notion of musical gesture as indexical sign of bodily actions, and emotion. An interesting trend in the literature is towards recognition of the compulsory nature of gestural signs.

In the section titled 'Congeneric meaning' I have introduced the kind of meaning with which this thesis is concerned, contrasting it with gestural meaning. I note some of the properties of congeneric musical signs which Coker and I both recognize, such as that congeneric musical meaning implies immanence of musical meaning, and that it results in reciprocity between signifier and object pairs, so that signifier becomes object and object signifier. I argue that Coker's emphasis is on the referential function of iconic signs (likeness is used to indicate reference), whereas I want to emphasise the abstraction of likeness between signs (reference indicates where to look for likeness).

4 Hardcore music rehearsal and performance

4.1.1 Introduction

This chapter presents the findings of an ethnographic study of 'hardcore' rock bands, undertaken in London and Bristol in 2007, supported with material from the interviews. I would claim that the kind of motor creativity I argue for in this thesis is utilised in all kinds of music where direct muscular control of the sound occurs (although perhaps not by all performers to the same degree). However, the interviews with hardcore musicians bring the issue of motor creativity into relatively sharp focus, due to the high value placed both on non-cognitive engagement with the music and on serendipity in performance.

In the second part of the chapter, I give an overview of the rest of the thesis and the main points of the argument.

4.1.2 Background of the study

The information in this section is based on interviews which I undertook with performing rock musicians in London and Bristol in 2007. The bands interviewed have released self-recorded albums through small record labels, and play gigs at small clubs in London and other cities in England. Two of the bands interviewed, *Cove* and *biRdbATh*, whose members are quoted here, were what it is convenient to refer to as 'hardcore' bands, a term which the members of the bands concerned neither wholeheartedly accept nor energetically reject, preferring not to be labelled with a genre at all. Recordings of the bands can be found online (*biRdbATh* n.d.; *Cove* n.d.).

The bands concerned both have drummers who (at least to my perception) tend to lead the beat—this is in contrast to, for example, pop bands or heavy metal bands, where the rhythm guitar usually leads the beat and controls the tempo. Vocals are sometimes present, but lyric content is not foregrounded (although *biRdbATh* utilises more vocals and their lyrics are more intelligible in performance than is the case for *Cove*). A sense of teleological song structure is also more important for *biRdbATh* than for *Cove*, but for both bands there is a tendency for sections within the song structures to remain static. The songs tend to remain almost exactly the same from performance to performance – the music is not improvised (in the sense that jazz usually is) and any changes tend to be incremental. However, *biRdbATh* members spoke of occasional instances where serendipitous aspects of arrangement occurred synchronously among players in performance. Song structures typically consist of a two or three different riffs, each taking a few seconds for one iteration but repeated many times in the song. A riff might

be repeated many times before the change to a different riff in the new section, or two riffs might alternate in a section (each being played several times in succession).

I have quoted verbatim from interview transcripts, in order that the reader can sense for themselves the reluctance of the musicians to expose the processes of performance to cognitive awareness. Occasional gestures noted in the interviews are also informative.

4.1.3 Minimization of cognitive involvement in performance

The form of the music is intimately tied with the way it is created and rehearsed. Songs are in most cases born from jamming, which gives rise in the first instance to a riff. This process may involve all band members from the start, or, where one or two members bring an initial idea to rehearsal, the rest of the band will be involved in developing the song from that point. From the initial idea, a riff will be developed further by playing for an hour or two at a time, with the whole band:

Again, going back to our first band practice I can sort of remember playing this one riff that was basically the only thing that I could work out how to play that sounded good to me and I could continue to play it, and we just would play it for a half an hour, an hour at a time, just playing this same riff.

Ben, bass guitarist, biRdbATh

Some limited experimentation occurs during this process, by trying out small changes such as will not disrupt the feel overall for the ensemble. Incremental changes will occur during this time and with decreasing frequency during subsequent rehearsals and performances, typically ceasing when one version of the song is fixed in a recording.

Riffs are drilled into memory through repetition:

How do you remember the actual riff? [...] A lot of the time, that's with repetition as well, (just)³ playing it again and again.

Ben, bass guitarist, biRdbATh

I think a lot of the time we do remember though, um, for instance today we were practicing and we just (practiced) – we played one new song, we wrote a new song today and we played it continually for a couple of hours. And I think, through repetition, that'll be drilled in now. But quite often if you leave it a while you can forget what you played.

Simon, guitarist/singer, biRdbATh

As might be expected, such a process of learning and rehearsal leads to a reliance on so-called 'muscular memory' while playing:

³ Text in parentheses in the interview transcripts indicates speech which is either unclear or spoken particularly quietly.

I guess it's the thing where you kind of ... always when like I'm playing live, especially, if you try and ... you have those little panics where you kind of have a blank, and ... like sometimes, before we play I'm just like .. thinking about ... watching like another band or something and I'm actually thinking ... like you know, you get your mind plays (all) tricks on you and I can't actually remember how to play any songs and ... it's almost like, when you're playing, if you think about it, that's when you mess up ... I find, then you sort of get that blank, if you think too many ... steps ahead ... whereas, I think if you've rehearsed enough, when you actually come to play it you do kind of switch off to an extent. It's weird it's kind of concentrating but ... a mixture of concentrating but kind of at the same time relaxing and not thinking about what you're playing too much, and sort of jinxing yourself, if you really think about it, so - I don't know, it's weird, it's some kind of stored ((L hand rises as if fretting guitar))⁴ ...

Dave, guitarist, *Cove*

Hardcore musicians are at pains to minimize cognitive involvement in the mechanics of performance. First, there is an aversion to music theory, even to the exclusion of knowing what notes they play in a riff. That the lack of theory is not simply a gap due to lack of training can be verified by the reluctance of the musicians to learn more theory, in case it should interfere with their creative process:

Ye-e-es. But it's something I'd like to know more about, but at the same time there's always the fear there now, of becoming - because if I was to go to a bass teacher and say, 'Teach me how to play bass properly and teach me music theory and enable me to read music, write music, write parts,' - although that might be helping me to be more thorough and make more precise compositions and be able to understand what I'm doing more, in a way I'd prefer not to understand. And, just using my ear, what I'm playing - it's a longer-winded, a more long-winded approach possibly. A lot more of it is about the feeling.

Ben, bass guitarist, *biRdbATh*

And I have been in bands in the past where it's been very like, 'Ok, so we're going to do like, these bars in this key and then this section there's a key change and then and ... this, that and the other, and ... I did all that but ... I don't like it quite so much, just like ((moving upper body slightly)) being able to stay loose with it and just go with it. So yeah a lot ... doing it by ear.

Tony, bass guitarist, *Cove*

⁴ Italicised text in double parentheses is used to annotate nonverbal activity, such as gestures and movements.

Yeah I do know pretty much on the keyboard what note that is and if I want to transpose that lower down, I can do that (straight away.) [...] It's with me all the time but I don't know every note, I only sometimes know what I'm playing, in fact to be honest with you I think if I really learnt that and I was always really aware of it, I don't think I'd write the same music when we're jamming. (Because) I think a lot of it is – is just experiment, as opposed to 'B should sound right here so I'll try B'.

Simon, guitarist/singer, biRdbATH

Whatever the aetiology of the rejection of music theory, it may be noted that, without theoretical concepts, memory for musical structure must be physio-sonic. Without theory, verbal labels for musical objects such as note names, key changes, chord progressions, and so on are not readily available. The performance will rely on muscular memory at the level of individual actions (a few hundred milliseconds) and at the level of the riff (a few seconds). Individual motor actions can accurately be thought of as physio-sonic events, with the physical action and its result in sound forming a mnemonic whole which serves a similar (but not identical) purpose to the notated score for a Western classical musician.

When we're not together as a band I would from time to time listen to a practice tape or some of the recordings that we've had and just play along just to try and get that – again, it's about physical memory as well, if you're just playing it you know, your hand (...) – you just remember, it just becomes a sort of second nature of that's how the song is, that's where the fingers go, you know ...

Ben, bass guitarist, biRdbATH

Yeah. ((thinks for a couple of seconds)) I'll generallyI'll remember a bit of a riff, that's generally how it works, when I'm trying to think of ((scrunches up eyes, looks up and R)) 'OK, (it starts on, what about) that song', I'll try and think of like, the main, lead riff that starts it, and that'll just ((shakes head)) click into my head (I'll know) ((R hand moves away from face)) that's the riff, so (I'm going) bit-da-bum-bitaditbum ((imitates drum fill)). (I'll know) just – the rhythm will come into my head, you know ((claps hands and moves head in syncopated rhythm)) that's the main rhythm so (I'm like, yeah) I got it now, d'you know what I mean, to...

Luke, drummer, biRdbATH

I don't know I think a song that you know really well it's just um ((shaking head)) the same as how you remember anything. You know, kind of like, how do you remember where your front door is? It's probably the same as that, you just know, don't you, 'cause you're always walking out it.

Simon, guitarist/singer, biRdbATH

The whole riff will be recalled through associative links between individual physio-sonic events—that is, the sound of what has just been played will trigger a motor action which produces the

next part, and so on. The duration integrated within one basic action, performed as a whole, is an empirical question, but presumably a basic action might encompass the whole riff.

Just as there is an antipathy to music theory, there is a reluctance to count bars to keep track of an arrangement:

No - I don't personally, I know there's some people that do. Er ... it's just a natural reaction, I think, once you've played it a few times (...) when you're first sorting out these things, and you'll mess up a few times or forget that there's supposed to be an extra little bit, or that bit taken off, or something along those lines but ... once you've played them through a few times it just becomes embedded.

Tim, guitarist, biRdbATh

I know with a couple of the songs we listen to his vocal line as almost like a cue, for when we're going to come in and when the change is coming, sometimes it's difficult if there's [...] something that's sort of twelve bars or something like that we kind of get a bit confused and even though we should be trying to simplify it and sort it out, rather than do that, rather than waste time with that, we just leave Simon to sing his part and we'll remember when he's got a certain vocal line that we can hear, 'That's the time to come in.' Yeah, yeah, that's it.

Ben, bass guitarist, biRdbATh

Generally, the musicians limit their conscious awareness of where they are in the arrangement to awareness of the next change—that is, what riff the next section will consist of:

I try and think, just like ... the next change ((chuckles)) [...] Yeah. I think it's just – yeah it all kind of links, in my mind it all kind of links together, kind of like a little map. But if I kind of look at the whole thing, it's just like, it'd be just like ... a mess basically.

Dave, guitarist, Cove

I don't really think ahead as such [...] That kind of makes me think of people playing chess, you know? And sort of thinking what they're going to do next. (I) just ... don't really do that a great deal, I don't think.

Tim, guitarist, biRdbATh

In summary, the process of learning, rehearsal and performance of hardcore music systematically eschews any approach which might detract from, or encourage the performer to depart from, combined physio-sonic memory.

4.1.4 Felicitous performance

In felicitous performances, musicians sometimes report a loss of the sense of agency; a feeling as if the music were playing itself; or as if the music were coming through the performer, rather than from them. The following quote conveys something of the experience, together with the sense of value associated with it:

[I]t's a Zen, it's a Zen thing I think. It's something, always through us (as) practising and improvising you kind of get a feeling that – you know you're almost on another level you're almost – you're not conscious of what you're doing, you get to that stage where you're kind of almost like a higher enlightenment kind of thing. It's almost that sort of feeling that you get, that you're not quite sure what you're doing and you're pushed beyond another level.

Ben, bass guitarist, biRdbATh

It is clear that the emphasis of value is on the process of performance, even more than the musical achievement which that process brings about. The attitude articulated here is implicit in the values attached by the musicians interviewed to particular approaches to rehearsal and performance, evident both in the interviews and in their observable behaviour.

For some songs, the number of repetitions of a riff to make up a section may be left open, depending on mutual agreement and signals between performers onstage, and occasionally on serendipitous simultaneous changes:

[S]ometimes there'll be moments when we're not looking at each other but all four will either hit that heavy thing, or really bring it down [...] And yeah, those moments [...].. it's priceless, when everyone just hits the same thing at the same time. [...] That's when you know that that song's definitely going to work. 'Cause it's obviously sort of pressing the same buttons on each of us at the same time.

Tim, guitarist, biRdbATh

That such unplanned communion between band members was implicitly valued by the musicians interviewed was evident from their attitude during rehearsal, as well as from similar comments made by various individuals.

Where the material of a piece of music – the order and rhythm of the notes and other sounds, and their timbres – is faithfully reproduced in each performance (as is the case for hardcore rock songs), changes of meaning can be produced through the creation of subtle patterns of correspondences in the precise timing and emphasis of the sounds in relation both to events elsewhere in the song, and to the parts played by other instruments. In this quote, it is evident that while experimentation may result in changes, the same riff can also be played differently without making any consciously identifiable changes to it:

Errm, just playing something and it either works, or it doesn't, and usually there'll be a part of it that works and you can hone in on that bit and expand that bit and just keep playing it until you're happy with it, or you're not happy with it at all and sometimes you'll just play it and ((scratches ear with finger)) you'll really like it.

Simon, guitarist/singer

Similarly, serendipitous concord between individuals during performance is not reducible to the specifics of arrangement, and is not consciously reproducible:

But that's what you're looking for as – again, the more bands I see, the more that I play in a band, the more I'm always looking for from a live performance, you know, I'm looking for that kind of semi-psychic ((chuckles)) connection between the band members, where they know what's coming next – they can all stop, look at each other, come into the (thing) – know when it's going to come in, when the song's there, they're, you know, sort of working on a higher level, almost. And again, that's something that's difficult to get across in your recordings, which is why, I think, you know, live recording is a good thing, is a better thing to do than to try and do it – record each instrument separately, 'cause you're – you're losing that sense of um ... aahh.. what (do) you call it ... you know, just ... I can't think of the right word, but you know, that ...ah, you know that push, that sort of that impulse, that's there when you're just listening to somebody play and you can't see what they're playing and you don't have that connection with another human being, you're just sort of playing with a disembodied sound. It's just not the same.

Ben, bass guitarist

In order to create new patterns of correspondences, previously unavailable to the performer, and to do so in response to new meanings being simultaneously created by other performers in the band, requires an openness to new possibilities in the performance of particular passages. Goal-directed actions can only be directed towards perceptual outcomes which can be imagined, that is, which are already known to the performer. What I want to argue is that the state attained in hardcore music performance involves a suspension of meaning, that is, a withdrawal from the preconceived goals of the actions of music performance.

5 The indefinite and immanent meanings of music

To “represent” something always involves the notion of two separate, dissimilar things, of which one must be intentionally related to the other through a particular mental act.

Eduard Hanslick⁵

5.1 Introduction

In search of the defining characteristics of music, I turn to three writers on musical aesthetics, Jean-Jacques Nattiez, Eduard Hanslick, and Susanne Langer. These three have been chosen in part because they emphasise immanent and congeneric meaning in music. They are also widely separated in date, which allows to some extent the balancing out of any bias due to their historical situation. The concerns of these three writers overlap to a large extent, and I identify several issues of interest. The elements of music include dynamic forms which are isomorphic with events of our inner life, but these are not identifiable as particular emotions. The essence of music is not extramusical reference, but neither is our response to the sound of music one of mere pleasure in sensation. An import beyond the merely sensual is created through relations between elements of the sound—meaning is immanent in the sound. The import created is, however, indeterminate. Music creates polysemy, perhaps infinite polysemy, and this is related to the indeterminateness of its meaning. Musical time is the creation of a perpetual ‘now’, and the experience of passage.

The chapter continues with a deeper examination of the notion of ‘immanent meaning’ in music and in particular, how non-referential meaning might arise in music. I propose that immanent meaning in music can be viewed as iconic signs in the semiological system of C.S. Peirce (1955). I review similarities between iconic signification and what Susanne Langer calls ‘symbolization’, and explore the properties of iconic signs. Drawing on Leonard Meyer’s (1956) notion of ‘embodied’ meaning, I characterise music as a system of ‘congeneric iconic signs’.

5.2 Jean-Jacques Nattiez: polysemy and indefinite meaning

In *Music and Discourse* (1990), Nattiez extracts a definite semiotic distributional structure from analysis of music; however, the existence of such a structure does not definitely imply a referential or representational function—the structure (the pure semiotic) might exist without actually meaning anything. In fact, Nattiez emphasises the looseness of the connection in music between the semiotic and its meaning.

⁵ (Hanslick 1986: xxii)

The symbolic form of a musical utterance (the signs or signifiers and their interpretants, taken together) has been produced by some process, whether with the intention of producing meaning or not: Nattiez calls this the 'poietic' dimension. The construction of meaning by the individual apprehending the sign is termed the 'esthesis' dimension. The physical, material embodiment of the symbolic form, accessible to the senses, is the 'trace' or the 'neutral' level, so-called to emphasise the relative independence of the esthetic process from the poietic.

Importantly, communication from composer to listener need not exist: the poietic and esthetic are both complex processes which do not necessarily correspond in either their workings or the meanings constructed. Nattiez does identify denotative meaning with those interpretants which are common to both the poietic and the esthetic, while noting that the relative autonomy of poietic and esthetic processes prevents the establishment of *a priori* criteria for denotation. Connotative meaning relates to interpretants which are confined to one or other of the poietic or the esthetic.

From the ideas of C.S. Peirce, as expounded by Gilles-Gaston Granger (in his *Essai d'une philosophie du style*, 1968), Nattiez gets the notion of tripartition of signs, into 'representamen', 'object', and 'interpretant'. Peirce's idea that the representamen's interpretant is also a signifier (a 'representamen' or 'sign' in Peirce's terminology) results in an infinite chain of signifiers and interpretants, since each signifier brings into being its own interpretant, which is in turn a signifier⁶. This idea of overwhelming polysemy is very like Turino's notion of 'semantic snowballing' described above (although not here dependent exclusively on indexical signs).

Nattiez (Nattiez 1990: 5-6) notes that the infinite chain of signs implies that the (final, singular) object of the sign must be a 'virtual object', existing only through the interpretants by which the sign's user seeks to allude to it. Nattiez refers to a complex of signs and interpretants—infinite in number—as a symbolic form. The symbolic function in general Nattiez characterises as representing that which is absent; it is an act of mental substitution (Nattiez 1990: 35). He thus definitely situates music as producing meaning—there is a disjunction between the 'worldly thing' which provides the physical experience of the sound, and the virtual object, or rather, the chain of interpretants which asymptotically approach the virtual object and which constitute the meaning of the sound. There is a surface contradiction between the symbolic form or virtual object which represents, and the lack of communication from the composer to the listener. The contradiction is avoided, however, if we accept that a virtual object is created—incorporating an infinite number of signs and interpretants—which is not determined by the composer.

Nattiez seems to see the arbitrary denotational and connotational meanings of music as swept up with the meanings belonging to the neutral level, all of them part of the infinite chain of interpretant-signs pointing towards an undefined object. That is, they are sublated by a singular

⁶ Like other of Peirce's ideas, the infinite chain of representamens and interpretants is confusing and its ramifications not fully integrated into a coherent system of thought. In later writings, Peirce put forward the idea of a termination to the chain of signification.

—but indefinite—meaning. Sublating particular referential meanings in a larger, indefinite meaning is the way poetry often works. Most poems

have subject matter, but such subject matter or meaning, when treated aesthetically, is not, in strictness, the meaning of the poem in the sense that it is something external to the poem that the poem symbolizes. It is the very stuff of the poem; not the whole stuff, but a part which enters into and fuses with the phrases and words and their assonances and rhythms to constitute the poem as an aesthetic organism.

(Garvin 1958: 64)

Here denotation produces connotation, which in turn interacts with the musical aspects of the poem, creating a whole which is not reducible to the sum of its parts—extramusical representation in music perhaps works in the same way.

The indefiniteness of the meaning which Nattiez ascribes to music is related to the absence of a need for communication between composer and listener. To communicate requires a message which is known to the sender and is understood in the same way by the receiver. For Nattiez, the virtual object which the chain of interpretant-signs approaches is not explicit—it is undefined at both the poietic and the esthetic levels.

5.3 Eduard Hanslick: Meaning is immanent in music

Eduard Hanslick, over a hundred years earlier, had a similar thought to Nattiez's:

[T]he powerful effect of a theme comes not from the supposed augmentation of anguish in the composer but from this or that augmented interval, not from the trembling of his soul but from the drumstrokes, not from his yearning but from the chromaticism. We should keep in mind, however, that scientific examination of the effect of a theme can only be done with those aforementioned invariable and objective data [ie. the neutral level], never with the supposed state of mind [ie. the poietic level] which the composer externalizes by means of them.

(Hanslick 1986: 33)

And he emphasises the same point in the following pages—whatever else it is, for Hanslick, music is not communication.

Hanslick's *On the Musically Beautiful* was first published (in German) in 1854; the 15th German edition, published in 1922, is still in print (Payzant 1986)—an indication both of how his thought continues to resonate, and the continued need for a 'Revision of the Aesthetics of Music' to which he refers in his subtitle. Hanslick's main thesis is negative: that the function of music is not, first and foremost, to represent feelings (Hanslick 1986: xxii). First, the feelings which listeners report as being evoked by particular musical works are not consistent, either between listeners or for one listener at different times (Hanslick 1986: 7). The fluctuations of

our inner activity can be similar for different feelings, and differ between individuals and at different times for the same feeling. It requires definite ideas and judgments to formulate a genuine emotion:

Not some kind of mere mental agitation, but its conceptual core, its real, historical content, specifies this feeling of love. Accordingly, its dynamic can appear as readily gentle as stormy, as readily joyful as sorrowful, and yet still be love.

(Hanslick 1986: 9)

Hanslick accepts that feelings will arise in response to music, as a secondary effect, but maintains that they are inessential to an aesthetic apprehension of music (1986: 5). He remarks that the idea that music expresses feeling (a misconception, for Hanslick) grew because 'feelings were considered to be the opposite of conceptual definiteness' (1986: 8) and so were considered to be the appropriate criterion to distinguish between music and the representational arts.

Hanslick was rebelling against what he saw as a particular malaise of the music aesthetics of his time, namely the idea that the content of music consists in feelings. He actually goes further: music expresses nothing at all.

The terms *unspecific* and *representation* are contradictory.

(Hanslick 1986: 20, italics in original)

Rather, he argues that 'the beauty of a piece of music is specifically musical' (Hanslick 1986: xxiii) and requires no extramusical referent, but is inherent in the relationships between musical tones. Hanslick's statement of his positive thesis is this:

The content of music is tonally moving forms.

(Hanslick 1986: 29)

Musical tones, for Hanslick, are the notes of the diatonic scale with their harmonic implications, which he considered (as did many others) as given in nature by means of the harmonic series. However, the statement regarding 'tonally moving forms' can be generalised to include other kinds of relationships between sonic objects to make it applicable to music outside the Western tradition of notated Art music.

The beauty of music is not mere pleasurable sensation or 'acoustical beauty', an 'ear-pleasing play of tones' lacking a 'mental source of animation'; ideal content is not excluded, but transferred to the 'tonal forms'; music has its own sense and 'logic' (Hanslick 1986: 30). (The word 'logic' should not be taken to imply propositional logic with conceptual terms, but is more akin to Susanne Langer's use of 'reason' to mean awareness of form or pattern—see below.) In music, unlike literature or painting, form and content are inseparable, which means that there is no independent content (Hanslick 1986: 80-81). As Hanslick's translator notes (Hanslick 1986: 115n9), for Hanslick the ideal content of music is immanent, rather than transcendent.

5.4 Susanne Langer: Music as unconsummated symbol

Langer's aesthetics of music is similar in important respects to Hanslick's—both insist on the immanence of meaning in the sonic artefact of music, while arguing against mere sensual gratification. Both see the basic elements of music as isomorphic to dynamic patterns of the inner life of humans, which however are indefinite in their reference.

In *Feeling and Form* (1953) Langer argues that art always has an air of illusion, that artistic artefacts appear as 'sheer image', even when the object in question is not a representation or imitation (as for instance, an artefact such as a pot, a building, or a musical work). In fact, she says, imitation of other things is not anyway where the essential power of representational images lies, but rather in the fact that an image is 'an abstraction, a symbol, the bearer of an idea' (Langer 1953: 47). In this sense of 'image', a nonrepresentational form can become an image when it presents itself purely to the senses, rather than as a locally- and practically-related object; in other words, an image carries immanent meaning. Langer extends the sense of 'image' to cover aesthetic objects in all sensory modalities.

This focus on the sheer appearance of things—which Langer calls *Schein*—frees sensory perception from the material existence of its source. Auditory sensation, for instance, which would normally evoke the thought, 'That's my telephone' can be contemplated in terms of sound qualities rather than functioning simply to point to an object and its activity (Langer 1953: 49). This is like what Pierre Schaeffer (1966) called 'reduced listening', in contrast to causal listening, which is listening for practical information about the sound's source. For Langer, all art is in this basic sense abstract, even 'the most illustrative murals and most realistic plays' (1953: 51). Langer's focus on the auditory image ('reduced listening') therefore does not require the exclusion of causal listening from music, but relegates it to an inessential position in relation to the basic musical function—as I have argued above regarding extramusical reference in general. The representational function of elements of a musical utterance can co-exist alongside its function as 'image', as defined by Langer.

Of course, music can and does contain extramusical references. Causal listening—listening for information about the world—may be a component of musical experience, particularly in some electro-acoustic music (Smalley 2007). Further, we tend to respond to sounds—whatever their origin—in terms of the human, physical activity which might have caused them. As described by electroacoustic composer Denis Smalley, the energy-motion trajectory of the human gesture which applies energy to a sounding body is reflected in the characteristics of the sound it produces—and in this regard we respond in the same way to electronically produced sounds as we do to the sounds of musical instruments played by physical bodies (1997: 111). However, the referential aspects of the sound are similar to the referential meanings of poetry, in that they contribute to but do not represent the whole meaning. Music with causal aspects (whether they refer to object identification, spatiality, or identifiable real-world events) can be argued to be ultimately abstract, in the same sense that Langer argues that 'the most illustrative murals

and most realistic plays' are abstract (1953: 51). Like other extramusical references, perception of causal references may contribute to the multi-dimensional structure of the music without thereby constituting the music's meaning—in the same way that Garvin (above) argues that the subject matter of poetry 'enters into and fuses with' the poem as 'aesthetic organism'.

The experience of an 'image', then, is of something existing autonomously in its semblance, which does not guide us to something tangible, but 'liberates the power of conception' (Langer 1953: 49). As Langer asserts (in *Philosophy in a New Key*), art is not just sensuous pleasure: art is significant form, expressive form (1969: 205). From the discernible elements of an image or virtual object, abstract form is created, and this is art. Artistic forms are 'immediately given to perception', but 'reach beyond themselves' (Langer 1953: 52)—which is simply to say, that meaning is immanent in the forms which are given to perception.

Langer (1953: 51) is explicit in stating that the abstract forms of art are symbols, which are expressive of human feeling. Musical meaning is not resident in sensual gratification; the sensuous form operates as a symbol which expresses 'the composer's *knowledge of human feeling*', it formulates and represents 'emotions, moods, mental tensions and resolutions' (Langer 1969: 221-22, italics in original). However, it is important also that such expressive dynamic elements be incorporated into the structure of an artistic symbol: music is not self-expression, although it takes its subject matter from the same source as self-expression. A composer articulates subtle complexes of feeling and presents them to our understanding as a logical picture. What is invited is not emotional response, but insight (Langer 1969: 222-3). In asserting that music represents emotions, Langer is conscious of being in opposition to Hanslick who insists that music's essential function is not to represent and in particular not to represent feelings. Against Hanslick's notion that music cannot be representation, since representation involves the conception of two separate things 'in explicit relation of reference' to each other, Langer argues that, outside of scientific expression, some modes of expression 'serve rather to formulate knowledge than to communicate its finished products' (1969: 225)—that is, artistic expression is a way of creating knowledge.

Accordingly, in the same chapter of *Philosophy in a New Key* that she dismisses Hanslick's rejection of musical representation, Langer has already contrasted music to the plastic arts in this way:

Music, on the other hand, is preëminently non-representative even in its classical productions, its highest attainments. [...] If the meaning of art belongs to the sensuous percept itself apart from what it ostensibly represents, then such purely artistic meaning should be most accessible through musical works.

(Langer 1969: 209)

This apparent contradiction in Langer's thought between the representative and nonrepresentative nature of music gives rise to her characterisation of music as an 'unconsummated symbol'. Although it is hard for us to accept that anything can be known which

cannot be named, music articulates forms which language cannot (Langer 1969: 232). Langer is therefore concerned to differentiate between the mode of signification which artistic symbols perform and linguistic signification.

Music differs from language in that the relationship between the symbol and its meaning is not arbitrary, as it is in language; rather 'form and content are one':

[Q]ualities enter into the form and in this way are as much one with it as the relations which they, and they only, have; and that to speak of them as "content," from which the form could be abstracted logically, is nonsense. The form is built up out of relations peculiar to them; they are formal elements in the structure not contents.

(Langer 1953: 52)

So, the symbolic form of music is immanent in the surface sensation of sound, but goes beyond that surface in its import. Similar to Thomas Turino's argument outlined earlier, the elements of music are dynamic patterns which express the inner life of humans, but which—a point not made by Turino—are formally organised.

5.5 Indeterminacy of meaning, polysemy, processuality

The impossibility of ascribing particular meanings to music is one of the arguments that Hanslick and others bring against the idea that music carries meaning. The originality of Langer's notion of the 'unconsummated symbol' is that it lets go of the common-sense idea that to mean, a symbol must mean something. To attempt to define what music—any music—means would be to fall into the trap of treating it as representational. It is this difficulty that Hanslick grasps:

Since music has no prototype in nature and expresses no conceptual content, it can be talked about only in dry technical definitions or with poetical fictions.

(Hanslick 1986: 30)

However, there is some conflict remaining between Langer's idea on the one hand that a symbol does not communicate existing knowledge but rather formulates knowledge; and on the other, that it formulates and represents 'emotions, moods, mental tensions and resolutions'. The problem is that 'emotions, moods, mental tensions and resolutions' are real-world referents, with as much particularity as (for instance) a fictional house in a painting, no matter how vaguely portrayed.

Langer perhaps means that musical symbols are 'unconsummated' because they are too indefinite to be linguistically identified. This view seems to be in agreement with the way many people think about music. Simon Frith, for instance, in *Performing Rites* argues the idea that both sound and image in movies are necessary for meaning making: the music gives us vague, inexplicit, ambiguous emotions, which, to become explicit, must be focussed around something

specific—and this is what the image and story provide (1996: 112). In fact, Royal S Brown, writing about film music in *Overtones and Undertones*, refers to Langer's idea of music as unconsummated symbol in just this context, arguing that music is 'ripe as an art form' for consummation in the representational nature of movies or in the 'specific, narrative situation.' (1994: 27). Similarly, Hanslick insists that song texts serve to focus a purely musical response which is indeterminate of emotion. Instances of vocal music separated from its text are 'like silhouettes' (Hanslick 1986: 18) and we can only guess at the specific feelings they express. Hanslick points out that the idea of musical passages as expressing or invoking particular emotions is undermined by the fact that Handel re-used music in the Messiah which had originally been composed for erotic madrigal texts and that similar examples can be found in J S Bach and other composers (1986: 19). Unless we want to argue that the religious and the erotic emotions are identical, we must accept that the emotions those passages of music evoke are indeterminate and that it is the text which focuses them, not just on specific objects but as specific emotions.

In general, we can say that there is a musical response which is independent of any association with a real-world referent, but that in practice the very indeterminateness of music in this respect means that it will colour the meaning of any context with which it (inevitably) becomes associated in our minds—whether through text, image, or social context. This does not resolve the question at hand, but only makes the paradox explicit: music does not mean anything (or at least, anything in particular); music somehow affects our being, inducing a response and colouring our response to other aspects of our world. Our response to a particular musical utterance appears to be indeterminate but in some way constrained by the music we hear.

5.5.1 Music and polysemy

Musical polysemy perhaps contributes to the indeterminacy of musical meaning. I have already mentioned Turino's notion of 'semantic snowballing', the idea that music piles sign on sign, preventing any of the signs reaching the point of conceptual identification—semantic arrest. Langer seems to agree in this description of the nature of music:

Articulation is its life, but not assertion; expressiveness, not expression. The actual function of meaning, which calls for permanent contents, is not fulfilled; for the *assignment* of one rather than another possible meaning to each form is never explicitly made.

(Langer 1969: 240, italics in original)

However, polysemy as such can be distinguished from indeterminacy. For Langer, a great composition is

not transparent but iridescent. Its values crowd each other, its symbols are inexhaustible.

(Langer 1969: 239)

In contrast to Turino, for Langer meaning is primarily immanent in musical signs rather than primarily referential and so she sees polysemy as resulting not from the richness of extramusical connotations which musical signs carry but through the formal organisation of the elements of music:

An idea that contains too many minute yet closely related parts, too many relations within relations, cannot be "projected" into discursive form[.]

(Langer 1969: 93)

Langer's reference to 'relations within relations' could be construed in terms of Peirce's theory of a chain of semiosis whereby the signified of a sign becomes a signifier for another sign. Since each relation can itself potentially stand in relation to another element of the music, it is not just that the multiplicity of relations is more complex than can be determinately apprehended but rather that the system of relations is in itself 'inexhaustible', or (as Nattiez has it) infinite.

5.5.2 The processuality of music

Langer notes that Bergson's notion of 'lived time' is the prototype of musical time, time in passage (1953: 115). Music seems to extend the objective duration of lived time, so that we experience a constant 'now'. This experience is heightened by the fact that music creates a mono-modal, alternative reality to the commonsense world. By letting our hearing monopolize the organisation of time, Langer claims, music creates an image of time in the transitory substance of sound, and so makes the continuity of time sensible (1953: 109-10).

Music—like dance, and in contrast to the experience of (for example) painting—is a temporal art, and this has fundamental consequences for the way we experience them:

[W]hereas when reading "space-objects" we only need to reproduce a writer's thought processes in order to grasp her argument or meaning, in "time-objects" (such as music, dance, and poetry) understanding is the same thing as "the very polythetic constitutional process itself."

(Frith 1996: 146)⁷

Hanslick seems to have intuited the same idea, with his notion that the forms which are constructed through music are 'mind giving shape to itself from within' (1986: 30). The essential temporality of music and dance is what makes performance central to them. According to dance theorist George Beiswanger, in performance,

⁷ Frith's quotes are from Alfred Schutz (1964) *Making Music Together*, in Schutz's Collected Papers.

doing and thinking are so aligned that thinking proceeds to deploy what the doing is to be, and doing provides the thinking with a manifest presence. What is thought out is precisely what is done, the thought-out dance and danced-out thought being one and the same[.]

(quoted in Frith 1996: 208)

This in turn recalls Husserl's description of 'provisional action' as

"a call to the I to act", such that "no distinction could be drawn between desiring and willing and, furthermore, no distinction could be conceived between willing in general and acting."

(Husserl (1932) Manuscript C 16 IV, quoted in Petit 1999)

Music performance which meets the descriptions provided in these three quotes, then, is more than just 'thinking with the body'—it is that, but it is also carrying out the action of the thought, in the very process of thinking it. The final chapter of this thesis is concerned with the mechanisms which underpin such a process in the performance of music.

5.6 Immanent meaning

5.6.1 The internal 'logic' of music

According to Eduard Hanslick the beauty of music is not mere pleasurable sensation or 'acoustical beauty', an 'ear-pleasing play of tones'; nor does it lack a 'mental source of animation'—rather, it has its own 'logic' (1986: 30). Susanne Langer similarly argued that Art is not just sensuous pleasure—Art is significant form, expressive form (1969: 205). Hanslick and Langer both argue that meaning is immanent in music, that it is a property of the sound in itself rather than of external reference. Nattiez is perhaps slightly less direct on the issue, declining to attempt a separation of referential meaning from immanent meaning. In contrast, Hanslick differentiates music from speech in just this respect (1986: 42). In music, and unlike literature or figurative painting, form and content are inseparable, which means that there is no independent content (Hanslick 1986: 80-81). Langer similarly differentiates music from language in that the relationship between the symbol and its meaning is not arbitrary, as it is in language; rather form and content are one.

Langer prepares her discussion of symbolic form in music by distinguishing between discursive and 'presentational' forms (1969: 89). She argues that we organise the sensory field into 'groups and patterns of sense-data' in order to perceive forms, and that this unconscious (and, I shall argue, nonconceptual) perception of pattern is the root of all abstraction:

[S]o-called “repeated” experiences are really *analogous* occurrences, all fitting a form that was abstracted on the first occasion.

(Langer 1969: 89, italics in original)

Of all the quotes from Langer which I have offered, this one seems most pertinent to the approach to perceptual meaning I have taken. I argue below that the meaning immanent in music is created through a system of mutually referring signs, with resemblances between musical events being abstracted according to the similarities between them.

Langer argues that in a broad sense any awareness of patterns in experience is a kind of reason, and this she explicitly differentiates from ‘discursive reason’ (1953: 29). Music, she maintains, involves the ‘logical structure of a type of symbol that logicians do not use’ (1969: 219). Although the elements of music modify each other’s characters in combination, as words do, they differ from words in not having a fixed connotation (1969: 228).

The contrasting properties of linguistic communication and music are specified in somewhat similar terms by Shepherd and Wicke in their *Music and Cultural Theory* (1997). Where Langer speaks of form as being built up out of relations between elements, relations which are ‘peculiar’ to the elements—that is, specific to their materiality—Shepherd and Wicke differentiate language from music in that language is not connected materially either within its own structure or to the world which it signifies:

The abstract as opposed to material character of the logical structure of linguistic propositions arises, therefore, *not* because the structure has no material grounds of its own (which it does within the bounds of language and within the electro-chemical circuits of the brain), but because it has no material *connectedness* of a logical or necessary character, *either* to the material conditions of the world *or* to the material conditions of language. [...] Signifier and signified must remain quite distinct from one another, a distinctiveness both guaranteed and required, it will be remembered, by the cross-sensory basis of verbal language.

Language thus serves to structure the world through relations of difference, but a difference based on opposition if not repulsion.

(Shepherd and Wicke 1997: 137, italics in original)

The relationship between the linguistic signifier and its signified is arbitrary, that is, merely conventional—there is no ‘material connectedness’ between language and the world it signifies. Because there is no necessary relationship between signifier and signified, relations which hold between two signifieds are not reflected in relations between their signifiers. Thus, the words ‘triangle’ and ‘square’ have an arbitrary relationship not only to the respective shapes they denote, but to each other. The signifieds of these two words are thus as discrete as the words themselves: the meanings depend on the use of the words, and, insofar as they are linguistically represented, cannot take on a life of their own. Linguistic representation can certainly inform us for example that a square is a kind of rectangle; but if we do not already

know this fact the relations between the signifieds must be constructed for us by a linguistic utterance which makes them explicit. If on the other hand we are presented with drawings of an oblong and a square, the relationship between them is implicit in the representation (although we will not necessarily be aware of it). There exists a relationship between the two signifieds, due to the concrete relationship—the 'material connectedness'—between the signifiers. No such inference can be drawn from relationships between the materiality of the words which stand for those objects.

Langer differentiates Art from object perception—Art frees sensory perception from the material existence of its source (1953: 49) to create a mono-modal alternate reality to the world (1953: 109-10). For Shepherd and Wicke, the fact that the elements of music relate to each other and not to the everyday world means that music establishes an alternate reality:

Music, in contrast, serves to structure the world through relations of difference based on attraction. [...] It is for this reason that, in being deployed in the commonsense spatio-temporal framework of the everyday world (as that framework and world have been *in part* produced through language by the acting *together* of both signifier *and* signified), *the sounds of music move to supplant that framework in creating their own.*

(Shepherd and Wicke 1997: 137-38, italics in original)

5.6.2 Musical signs as Peircean icons

Both Shepherd and Wicke's requirements for musical signs and Langer's 'logical structure of a type of symbol that logicians do not use' can be explicated in terms of the Peircean icon.

In Peirce's trichotomy of sign types—symbol, index, and icon—linguistic signification is the paradigm for symbols. Peircean symbols (such as linguistic signs) share no concrete properties with their referents, their meanings being determined instead by convention. The sign function of a Peircean index, by contrast, depends on it being materially affected by the object to which it refers. As its name suggests, the index functions ostensively, pointing at its referent without defining it.

The icon's function as sign, on the other hand, does not rely on it being materially affected by the object to which it refers, or even on its existence (Peirce 1955: 102). Iconic signs—images, diagrams, and metaphors—represent through similarity (Peirce 1955: 103). There exists (as in Shepherd and Wicke's description of musical signs) a relation of 'material connectedness' of a 'necessary' character, so that aspects of the materiality of iconic signs are matched to their referent in a way which is not true for symbols.

In matching aspects of materiality between icon and referent, an icon embodies what Peirce terms a 'qualisign'—that is, the abstract quality of the concrete icon taken as a sign, which holds the relevant similarity with the referent.

An icon is a sign which would possess the character which renders it significant, even though its object had no existence; such as a lead-pencil streak as representing a geometrical line.

(Peirce 1955: 104)

The 'character which renders the iconic sign significant' is just the qualisign it embodies. A qualisign is necessarily an icon since it refers to its object through similarity (Peirce 1955: 115). A geometrical line purely abstract, a concept which cannot be instantiated (since it exists in only one dimension, having length only and no width or thickness), but only represented. Peirce's example illustrates both the abstract quality of the signified and the concrete quality of the signifier (the lead-pencil streak) which creates it.

What Peirce's example of the geometrical line does not make clear (since it relies on an implicit knowledge of mathematical theorems which Peirce does not acknowledge) is that the abstract signified is normally at the intersection of the two concrete materialities of the sign and its referent. The archetypal example is perhaps a map, which has a materiality of its own which is different from the materiality of the territory to which it refers. The abstract properties common to both (ignoring other conventions of maps, such as legends and linguistic information) are the spatial layout of points in the territory in relation to each other and the proportional distances between those points—these are the signifieds of the sign.

The 'relations of difference based on attraction' which Shepherd and Wicke identify (above) as characteristic of musical structure seem to be exemplified by the difference between signifier and referent which allows the abstraction of a signified, and the similarity ('attraction') between signifier and referent by which icons represent.

The icon qualifies as a mode of expression which (as with music) serves 'rather to formulate knowledge than to communicate its finished products' (Langer 1969: 225). The Peircean icon's function is less to denote an object or event, than to create an abstract idea from the intersection of two objects or (musical) events. Viewed in this way, iconic representation bears a strong similarity to the apprehension of patterns in experience which Susanne Langer identified as underpinning nondiscursive reasoning:

Underlying all the varieties of symbolic expression and symbolic understanding, Langer believed, is a fundamental capacity to apprehend forms, *gestalten*, or patterns in experience. "By the recognition of forms we find *analogies*," she wrote, "and come to understand one thing in terms of another" (1930: 88). When we see that two things exhibit a common form or pattern, we may use one of them to formulate a *conception* of the other—to serve as a vehicle for *symbolization*; and any medium in which we can construct and manipulate complex configurations of distinguishable elements can help us to formulate a conception of something else that exhibits a similar pattern.

(Dryden 2007: 28, italics in original)

Unlike indices, which as Peirce notes, 'direct the attention to their objects by blind compulsion', icons rely rather on an active reading by the perceiver of the sign (1955: 108). The sense in which iconic signs require active reading can be understood in terms of the relationships and patterns which can be optionally identified and objectified by the reader of the sign, who may have been until then entirely unaware of them—this is one of the purposes for which researchers create computational models of natural processes. It is also true in the sense that the sign is potentially richer in meaning than the understanding of its creator, due to the fact that it embodies its signified properties. Thus, someone might make a model of economic or ecological or neuronal processes, in order to learn more about the behaviour of those processes; or make a map in order to find directions and distances between two points which were both situated on the map initially by reference to a third point. Inasmuch as the signifier is a kind of model of the referent, it may include information which was not apparent to the constructor of the sign. Multiple, unintended meanings are possible, and in this sense the icon is polysemic.

5.6.3 Congeneric iconic signs

The map is not the territory, nor would we want it to be. A map brings things within the scope of present vision which would otherwise require travel over some distance to discover. But it is not just the inconvenience of carrying, unfolding and reading a map with the scale of a mile to a mile, as invented by Lewis Carroll in his novel *Sylvie and Bruno* (1889). A signifier which was identical in every detail with its referent would be simply a duplicate of the referent, with no information selected for representation. The abstraction which an icon achieves is a useful reduction of the information available from the referent. Similarly—since an icon has its own materiality—the signified itself embodies a reduction of the information available in the signifier (for a map, the concrete properties of the physical map). The abstract signifieds are qualisigns, qualities of objects which require physical instantiation within a concrete iconic sign in order to be perceived. The corollary of the reduction of information which the signified represents is the excess materiality embodied in the concrete icon which the abstracted signified is unable to exhaust, and which is treated as irrelevant.

Leonard Meyer (1956) made a relevant distinction between two kinds of signs which cuts across the Peircean trichotomy of index, icon and symbol. Meyer describes 'embodied meaning'

as meaning which is produced by a stimulus and an object of the same kind, and opposes it to 'designative meaning', in which the stimulus points to an object which is different in kind. Meyer's designative signs would therefore include both linguistic reference (where the relationship is arbitrary) and iconic signs such as referential pictures (where the two-dimensional depiction on paper is of an obviously different kind from the three-dimensional object it depicts). The term 'embodied' today evokes the notion of physical, human embodiment—since this idea of embodiment is central to my thesis in obvious ways, I will use instead Coker's (1972) term 'congeneric meaning' and its converse 'extrageneric meaning'.

Important properties of the sign system follow from the fact of the signs being congeneric. The lack of distinction between original and copy, between referent and sign, leads to a proliferation both of referents and of signs. An iconic sign, in creating an abstract signified, creates itself as a concrete signifier. Where signifier and referent are congeneric, every signifier in turn becomes a referent, which is open to representation by other signifiers, which in turn function as referents, and so on.

The proliferation of referents and signs means that a given musical event (at the level of approximately one or two beats of the meter) will be in a multiplicity of sign relations to other musical events (this is especially true of, but not limited to, events which are repeated). The conjunction of the same event as sign-referent in relation to a variety of other musical events results in the abstraction of different signifieds in each case. For example, a short melodic motif and its repetition, transposed up a fifth, share the same intervallic and rhythmic structure between the two sign-referents (ignoring, for simplicity, the harmonic implications of the transposition). In this way, intervallic structure can be abstracted as a signified from the juxtaposition of the two motifs. However, a third motif may preserve the rhythmic structure but change the intervallic structure of the preceding two, thus (in terms of the relation between motif three and the first two) discarding the intervallic structure as excess materiality of the signifier, and highlighting the rhythmic structure as the abstract signified. Furthermore, intervallic structure may result in a signified which is the abstraction of melodic contour.

Thus the set of transformations which map, in this example, each melodic motif onto each of the other motifs, is large. Once we consider the possibility of identity of melodic contour, with different intervallic structure, diminution and augmentation of rhythm, and all the well-known devices of motivic transformation it is obvious that the possibilities of relations between sign-objects expand exponentially. This is the foundation of one type of polysemy in music, the multiple relations between musical objects which characterise any single object in a number of ways.

I have chosen to illustrate congeneric iconic signification with an example of a melodic motif because it is easy to describe. However, the principle is the same for transformations of what Denis Smalley calls the spectromorphology of sound events (1997), meaning the way the spectral content changes over the duration of the event. Spectromorphological transformations of sound are part of the available vocabulary of electronic composition, since they can be

effected easily though the application of a filter to a repetition of an audio signal. Similarly, rock guitar passages are common which provide no clear pitches but instead a series of events involving spectromorphological transformations. Because we have no precise vocabulary to describe timbral changes, it is difficult to write clearly about spectromorphological changes. However, the same principle of abstracting a signified from the intersection of two concrete events of the physical world can be translated to the realms of electroacoustic or electronic music and rock music.

5.7 Summary

In this chapter, I have surveyed the music aesthetics of three authors, Jean-Jacques Nattiez, Eduard Hanslick, and Susanne Langer. Among these authors, there is a general acceptance that extramusical meaning is possible in music; however, for Nattiez, Hanslick and Langer extramusical meaning is not a fundamental characteristic of music. Where it exists, specific extramusical meaning is sublated into the indeterminate import of the music.

Hanslick and Langer argue that music is immanent in its sound: we hear the sound as sensation, rather than in terms of object perception, but the formal organisation of sound goes beyond mere sensual gratification. Nattiez agrees in this last point, using the term 'virtual object' as that which goes beyond the physical sound of music. Langer's term is 'unconsummated symbol', while Hanslick simply talks of 'aesthetic beauty'. All three authors agree on the indeterminateness of musical import, while the polysemy of music appears to be related both to that indeterminateness, and to the processual nature of music. Nattiez, Hanslick and Langer each make passing reference to the processual nature of music, and to its creation of a perpetual 'now'.

I have proposed that the immanent meaning which music creates can be explicated in terms of the iconic sign function described by C.S. Peirce. Iconic signification exhibits properties which satisfy the description of various writers on music aesthetics: in creating a system which differs from discursive logic, in enabling abstraction through material similarities between signs, in providing for polysemy, and in requiring an active reading. The special status of icons within the musical texture as congeneric increases polysemy through a proliferation of signifiers and referents, and through relations between any sign-referent event and multiple other events.

I have now completed my exposition of ideas from music aesthetics. The remainder of the thesis proceeds to unpack the insights I have culled from Jean-Jacques Nattiez, Eduard Hanslick, and Susanne Langer, in terms of analytic philosophy and cognitive science. Chapter 3 takes up the notion of immanent perception in relation to the process of phenomenological reduction and the search for the essence of the object-event by Schaeffer and Husserl.

6 Perceptual reduction and immanence

6.1 Introduction

This chapter explores the implications for creative hearing of the notion of 'immanent meaning' in music. The first part of the chapter approaches the notion of immanence via the epistemology of perception, relating it to perceptual reduction. Perceptual reduction is the relinquishing of 'perceptual constancy' by which objects in the world are normally perceived to be stable in features like size and colour. This is followed by a discussion of perceptual reduction in music listening, including how perceptual reduction is encouraged in concert situations.

The next part of the chapter investigates the phenomenology of sound. Husserl's phenomenological reduction is equated with perceptual reduction. Radiophonic pioneer Pierre Schaeffer's notion of 'reduced listening' is introduced, formulated by Schaeffer through the application of the phenomenological reduction to audition. Schaeffer's notion of an 'objective' sound object, apprehended through the technique of eidetic variation leads to a critique of Husserl's immanent essences. I note that eidetic variation is like congeneric iconic signification, as I have described it in the previous chapter, in that it abstracts across a series of similar-but-different immanent perceptions. However, eidetic variation utilises imagined variants rather than concrete percepts and I argue that as a result its outcome is to put forward sedimented perceptions. I conclude that having actual percepts of sound is a necessary but not sufficient condition for creative music listening.

6.2 Immanence and perceptual reduction

6.2.1 Primary representations and proximal sensing

The immanence of meaning in the sound of music supplants the normal function of sensory perception—to provide information about the surrounding world. In audition, we normally engage in what Schaeffer (1966) called 'causal' listening—listening for information about events in the world. Phenomenologically, our perception of objects and events in the physical world is transparent—in normal circumstances we are not first aware of sensory input, separate from its meaning, and only subsequently aware of the event or object it represents to us. We do not hear sets of frequencies with particular dynamic behaviours, we hear a match being struck, a car starting, a footfall. We do not (normally) see a red two-dimensional shape with variations of colour shade or saturation, we see a tomato. It requires a shift of intentionality to become aware of more proximal events of sensory perception which contribute to event and object perception.

Nevertheless, it is possible on occasion to make just such a shift, from perception of the event-object to awareness of the sensory components of that perception. This is a shift in what Dretske (1981) calls 'primary representation'. If we hear the doorbell ring, we give primary representation to the bell ringing rather than to the button being pushed because information about the button push is dependent on the informational link between the button and the bell. If there is a short circuit so that the bell rings when no one is at the door, then the ringing bell does not carry information about the button being pushed. We give primary representation to the ringing bell because our experience of the bell ringing is direct and not dependent on the link. The rule determining what is given primary representation can be stated thus:

Our giving primary representation to the ringing bell (relative to the button push) means that our representation of something's being '*button push*' depends on the informational relationship between '*ringing bell*' and '*button push*' but not *vice versa*.

Or in Dretske's more general formulation:

S gives *primary representation* to property *B* (relative to property *G*) = *S*'s representation of something's being *G* depends on the informational relationship between *B* and *G* but not *vice versa*.

(Dretske 1981: 160)

However, Dretske (1981: 162-64) argues that we do not normally give primary representation to proximal sensory events because the organism's way of coding sensory information puts the perceptual object outside the perceiving organism. Thus, we represent the 'bell ringing', rather than the frequencies and temporal behaviour of the sound it makes, because the bell is part of the world. 'Constancy mechanisms' ensure that we represent the size, shape, and colour properties of objects, rather than the properties of retinal stimulation. For instance, the colour of the wall appears to be the same, even at the points where it is subject to different illumination. Objects do not appear to be changing their size and shape as they move about. Stationary objects do not appear to move when we change the direction of our gaze, or when we move around them; but do appear to move when we track them with our eye, although there is no movement on the retina.

To experience movement, then, is to receive information, not about what is happening on the retina (there may or may not be movement occurring here) but about what the more distal source is doing.

(Dretske 1981: 164)

In addition, our perceptual systems are sensitive to 'higher-order' variables in the stimulus, that is, to ratios, gradients, and rates of change in or among the local (proximal) counterparts of the distal stimuli. For instance:

What accounts for size constancy is (among other things) the relative amount of textural details (in the background) occluded by the object. Since there is a gradient in the textural field, the amount of texture occluded will remain constant as the object moves away. Aside from these higher order variables, it also seems clear that our sensory experience is determined, in part at least, by information from other sense modalities. That is, the perceptual system “takes account” of information about the body's tilt (relative to gravity), the position and movement of the eyes, head and trunk, and so on.

(Dretske 1981: 164-65)

That is to say, we give primacy of perceptual representation to distal event-objects on the basis of a synthetic unity of perception—this can be called ‘constancy mode’.

Dretske (1981: 165) notes that the distinction between constancy mode and proximal mode is related to J.J. Gibson's distinction between the ‘visual world’ and the ‘visual field’. Under conditions of ‘perceptual reduction’—precisely those conditions in which we for some reason refrain or are prevented from cross-checking percepts one against the other—

we no longer see a stable world of objects but an ensemble of continuously varying entities—things that are continuously changing their brightness and color (as the illumination changes), their size and shape (as we and they move about), their position and orientation. [...] Under such conditions the physical object comes to occupy the status of the depressed button in our doorbell example.

(Dretske 1981: 166)

In proximal mode, the physical object (or event in the external world) occupies the status of the depressed button while proximal percepts are given primary representation—they come to occupy the position of the ringing bell.

6.2.2 Achieving perceptual reduction

To achieve primary representation of the proximal percept requires some mechanism of perceptual reduction, whether deliberate phenomenological reduction or for instance the experience of a situation where the availability of sensory information is limited. I shall argue that music promotes perceptual reduction in two main ways. The most important way for the purposes of this thesis is the system of sonic patterning which draws the focus of attention away from the relationships of sound with real-world entities and towards the intramusical relationships of sound experienced immanently. That is the topic of the next section. In this section, I briefly discuss the ways in which source-bonding—the link between sounds and their real-world causes—may be obscured and disrupted.

Schaeffer saw the newly-available technologies of sound recording, telecommunications and radio as providing the possibility of ‘acousmatic’ sound to the composer. The word ‘acousmatic’ derives from the ancient Greek word *akousmatikoi*, which referred to Pythagoras's disciples, who listened to the master through a curtain which obscured him from their sight while allowing

them to hear the sound of his voice (Kane 2007: 17). Similarly, radio, recording playback and telecommunications emanate sound without the corresponding visual of its source. Recall that Susanne Langer felt that music created the experience of a constant 'now', an experience which was intensified by the fact that music creates a mono-modal, alternative reality to the everyday world (Langer 1953: 109-10)—the curtain which blocked Pythagoras from the view of those less-favoured disciples made their experience of his lectures a mono-modal experience. They could still see, of course, but that could not see the source of the sound on which they were focused.

In the acousmatic situation, we can still hear sound causally (or 'indexically') but we are prevented from obtaining pertinent information via our other senses, or by interacting with the sound source. A single perceived 'scene' (a part of the world as experienced by the subject from their position in space and time) is a synthesis of visual, auditory, olfactory, and tactile impressions which are normally referred to particular physical sources in space. We expect those sources and the sensory impressions to which they give rise to obey the laws of relation which we have learnt that apply in the world, or in the more specific context which we momentarily inhabit (Stevenson 2000). Such ecological and statistical experience would be built on, for example, the sounds associated with objects in our visual field, the relative scale of different sounds, aural patterns of causality (this sound follows that action, or that sound), and the nature of reflected sound, which tells us about the space we are in. The acousmatic experience reduces sound to a mono-modal experience, just as Langer described.

Sound differs from light in a number of ways which make mono-modal auditory distal perception less stable. In most situations, light is continuous rather than intermittent—we can reliably locate objects in space which were there before. Sound, however, is not coterminous with the object which produces it, either temporally or spatially. Where the sight of an object remains (unless the object is occluded or removed entirely), sounds from the same present object tend to start, stop and vary. The sight of an object appears to extend precisely to the edge of the object and no further, whereas sound may be (weakly) directionally localised but does not provide a direct mapping of space.

The objects which reflect light so that we can see them are stable and enduring—they may move or be occluded, but they do so in generally predictable ways so that we know that they will reappear again given the right sequence of actions (track the object with the gaze, move away that which is occluding it, or turn the head to look at it again). The distal referents of sounds, on the contrary, are not objects but events, which have a beginning and an end in time.

6.2.3 Sound as located events

Given that sounds are events, rather than objects, it is perhaps reasonable to expect that we hear them as events, even if the source is unidentifiable or multiple echoes prevent localisation of the sources of sounds. David Roden (2007) argues that the phenomenology of sound

events is such that they are perceived as being of the world, physically based, even in situations of perceptual reduction or where listeners are more concerned with morphological relationships between sounds within music. Certainly there are composers who treat sounds as located events. For composer Denis Smalley it is important that sonic events in electroacoustic composition are source-bonded (ie. have a definite source, whether identifiable or not) and that the gestural space of an individual performer is nested within an ensemble space. Smalley explicitly models his construction of space on this hierarchical structure of causal space and intends that the perception of these spaces is transmitted intact to the audience (2007).

Neither the explicit use of source-bonding in Smalley's approach nor the more fundamental objection that sound events are phenomenologically representational conflicts with my argument here. As argued in the previous chapter, the existence of extramusically referential elements in music (and other arts) does not entail that it cannot also embody processes involving purely abstract forms—what Langer referred to as 'sheer image' (1953: 47). Music achieves immanence by constructing a system of intramusical relationships which provide an alternative focus to the cross-modal relationships which provide cues to the physical world. Referential meanings such as source-bonding may contribute to the import of the work of art, without being its whole meaning. All I am concerned to demonstrate at this juncture is that patterns of relationships between proximally sensed sounds are essential to the fundamental processes of music.

The perception of patterning among proximally sensed sounds may in some cases be enhanced by promoting perceptual reduction, and some musical situations seem to work to undermine both cross-modal contextualisation of sounds and their location in space. The music I am most directly concerned with in this thesis is live rock music. The volume at which rock is normally played—generally above 100dB SPL and often considerably higher—creates an immersive sound environment. Martin Clayton has pointed out in the context of a North Indian classical vocal concert that such high levels ensure that the attention of everyone in the space is directed towards the performance. Further, it becomes difficult to locate the direction from which the sound arrives to the ear (the result of high levels of reflected sound) so that the sound-to-source relationship is disrupted (Clayton 2008).

With the experience of immersive sound, not only source-bonding of the sound is disrupted but other aural cues which we use in establishing and maintaining our sense of the integrity of our environment are occluded, masked by the overwhelming volume of the music. An immersive sonic space inverts the notion of the gestural space which Smalley describes: rather than intimacy being 'deduced' from visual and aural observation of proprioception as it produces sound (2007: 41) the whole larger area of a small rock club becomes an intimate space. We are inside the sound and the attention of all the people there is forced towards the single continuing sonic event which is the music. Basic source-bonding via visual cues may be possible for people who have a sight-line to the band, but effects processing (guitar pedals, for instance) often adds dimensions to the overall sound which have their own

spectromorphological behaviour and which may not be easily rooted back to a single instrument. The lack of directional cues in a normal rock mix contribute to this effect—the guitar amplifiers have microphones on them, and the signal is fed to both sides of the front of house mix, and probably into onstage foldback monitors as well. The overall effect tends to be a melding of individual sounds and diminution of the source-bonding effect.

6.3 The phenomenology of sound

6.3.1 Husserl's phenomenological reduction

Distal perception is our normal mode of perception—proximal perception is transparent in everyday perceiving. However, it is possible to deliberately give primary representation to proximal percepts. From the natural standpoint in Husserlian phenomenology, our perception is founded on a belief in the objects of the physical world and we take our sensing to be of those exterior objects (Kane 2007: 17). Husserl's phenomenological reduction (*epoché*) involves a deliberate move away from the natural standpoint of belief in the existence of physical objects, and with it a suspension of distal sensing which provides us with the perception of space. Thus, the result of phenomenological reduction appears to be proximal sensing; and perceptual reduction appears to be very like Husserl's phenomenological reduction, a return to 'the things themselves' of experience.

We can never have a complete (or 'adequate') perception of a physical object, since our perception is always limited in perspective. But if we turn our attention away from the world and focus on our most immediate experience of it, we can say that prior to any identification, there exist objects of perception which are immanent to our sensory field and are aspects of the natural object which we think of as 'out there' in the world. For Husserl, only such immanent perceptual experiences are 'adequate' (Hermberg 2007: 25). Such proximal sensing can be achieved through phenomenological reduction, by means of the *epoché* or temporary cessation of belief in the things of the material world.

The succession of perspectival views, which Husserl called 'adumbrations' (Kane 2007: 16), taken together indicate a real-world object, something which transcends the immanent percepts or our sensory experience and is perceived as having a continuing existence independent of our momentary apprehensions of it. However, Husserl found that even while suspending belief in the existence of material objects, successive perceptions of an object exhibited a continuity of identity quite at odds with the variety of individual perceptions:

Keeping this table steadily in view as I go round it, changing my position in space all the time, I have continually the consciousness of the bodily presence out there of this one and self-same table, which in itself remains unchanged. But the perception of the table is one that changes continuously; it is a continuum of changing perceptions. [...] Only the table is the same, known as *identical* through the synthetic consciousness which connects the new perception with the recollection [...]

(Husserl, E. 1928. 'Ideas', as quoted in Kane 2007: 16)

This continuity of identity through a succession of immanent perceptual experiences is an aspect of our experience of the present. The phenomenon of continuity of identity and the capacity for synthesis of a whole from the succession of perceptual events are complementary attributes. Both are necessary for the transcendent perception of an object through its perceptual adumbrations. Both are identified by Husserl (1991) as properties of the phenomenology of the consciousness of the 'specious' present. (I investigate relevant aspects of the specious present in Chapter 5, and active abstraction from a series of immanent percepts in Chapter 6).

6.3.2 Schaeffer's sound object

Distal and proximal perception have most often been explored in relation to visual perception of objects in the world. The translation to auditory perception entails a shift to the perception of events, rather than objects. Schaeffer in his (1966) *Traité des objets musicaux* developed his notion of reduced listening through the application of Husserl's phenomenological reduction to auditory perception. Like Husserl, Schaeffer describes the phenomenological reduction (*epoché*) as a deliberate move away from the natural standpoint, in which perception is of objects (or events) in the real world:

'... there is no sound object: there is a perception, an auditory experience, through which I aim at *another object*' (Schaeffer 1966 [*Traité des objets musicaux*])). A sound object is only possible when a sound no longer functions for-another as a *medium* (as in the case of indicative and communicative signs), but rather is perceived *immediately* in-itself.

(Kane 2007: 18, italics in original)

A 'sound object', as defined by Pierre Schaeffer (1966), is possible only when the sound is not heard as an indication of its source (its cause) and instead the immediate auditory experience itself—the immanent perception—becomes the focus of consciousness (Kane 2007: 18). Within the sphere of pure immanence Schaeffer distinguished between *ouïr* and *entendre*:

Ouïr, is to perceive with the ear, to be struck by sounds, it is the lowest, most elementary level of perception; one passively “hears” many things that one neither seeks nor listens to (*écouter*) nor understands (*comprendre*) ... *Entendre*, is, according to its etymology, to manifest an intention to listen, to select from what we hear (*ouïr*) that which particularly interests us, to effect a “qualification” of that which we hear[.]

(Chion 1983: 25; as quoted in Kane 2007: 18)

However—rather than the equivalent of the transcendent perception of the physical table indicated by Husserl’s synthesis of adumbrations—Schaeffer is seeking the ideal essence of the sound object through successive immanent auditory events. Schaeffer in fact went on to organise and classify immanent perceptions of sound into a taxonomy (laid out in the *Tableau récapitulatif de la typologie* (1966)).

Any classification of course discounts some features of the classified object as inessential, while privileging those regarded as essential to the particular class in which it is deemed to fall. On what basis does Schaeffer organise his typology? Schaeffer’s method of determining the essence of a sound object drew on Husserl’s technique of ‘imaginative free variation’ (Kane 2007: 19), by which the immanent perceptual object is imagined with different properties:

Perhaps we begin by fictionally changing the shape or colour of the object quite arbitrarily...In other words: Abstaining from acceptance of its being, we change the fact of this perception into a pure possibility, one among other quite “optional” pure possibilities – but possibilities that are possible perceptions. We so to speak, shift the actual perception into the realm of non-actualities, the realm of the as-if.

(Kane 2007: 19)

As Kane notes, variation is a technique for revealing essence. In the *Solfège de l’objet sonore*,

Schaeffer relies upon variation to clarify the objective character of the sound object. By taking a sound, and using electronic means to alter its qualities, Schaeffer pedagogically demonstrates the objectivity of the sound object across its various instantiations. No two instantiations are exactly the same: from an acoustician’s point of view, the signal would contain measurable differences in each case; from the phenomenological point of view, each adumbration (or set of adumbrations) differs in aspect from the last.

(Kane 2007: 19)

Thus Schaeffer arrives at an ‘objective’ essence, exemplified through an imagined series of which the individual instances are tokens of the type or essence. In some sense, each perceptual event is more than the objective sound object itself, containing as it does phenomenological differences from other perceptual events which also exemplify the sound object. It would seem that such abstraction of ‘objective’ essence results from the qualification of or selection from what we hear (*ouïr*), which Schaeffer designated as *entendre* (Kane 2007: 18). The sound object itself is an abstraction from the series—the difference between

(imagined) perceptual events is necessary in order to achieve the abstraction of the objectified sound object.

The 'mode of givenness' may change but the 'central core' remains the same (Husserl 1928: 189–90); in other words, this core, this irreducible remainder that underlies aspectual difference, is simply *this* sound object (the one unifying *this set* of imagined or real adumbrations) grasped as a specific essence.

(Kane 2007: 20)

This is very similar to the way I have described congeneric iconic signification in Chapter 2. There, I used motivic variation of melody as an example, while noting that the same principle could be applied to the relationship between sounds in electronic music. Peircean icons represent through similarity; congeneric iconic signification involves signs and referents which are of the same kind (such as perceptual events in music, or the phenomenologically different iterations of a sound object). In the experience of music listening, immanent percepts take on the function of congeneric iconic signs. Relations are between percepts, rather than between percept and the object it indicates. The system of musical signification perverts the natural function of perception, which is to connect with the external world. Instead, immanent percepts take on the roles of both signifier and referent. In accordance with Susanne Langer's idea that music creates a mono-modal alternate reality to the world (1953: 109–10), the signification process of music supplants the everyday framework of reality which, as Shepherd and Wicke note is (partly) created by the connection between signifier and signified of linguistic signs (1997: 137–38).

The signified of the iconic sign is abstract, a quality of which any instantiation necessarily involves other qualities which are inessential to the abstract signified—just as the 'objective' sound object endures through imaginative or actual variation of inessential qualities. It is perception of the similarities between the imagined percepts in eidetic variation on the one hand, and between the actual percepts of successive musical events on the other, which allows us to hear a succession of phenomenologically different auditory percepts as varied iterations of some abstract sameness. A critique of eidetic variation will help to clarify the similarities and differences between it and congeneric iconic signification in music.

6.3.3 Immanent essences

In the *Ideas* (1962), Husserl introduces the distinction between immanent and transcendent essences. According to Husserl, immanent essences are essences of the immanent formations of consciousness; and belong to the same stream of consciousness as the experiences themselves (Levin 1968: 7). Transcendent essences can be given only with inadequacy and are necessarily always incomplete. Levin gives as examples of transcendent essences 'thing', 'spatial shape', 'movement', 'color of a thing', 'soul', and 'human feeling'. By contrast, according to Husserl, immanent essences 'are always accessible to adequate, absolute, and primordial

eidetic apprehension' (Levin 1968: 7). The means of finding immanent essences is, as described above, the generation of a series of imagined arbitrary variants of the original:

Taking an empirical fact as our point of departure, we transpose the factual experiences to the realm of irrealities, of the "as if," which confronts us with the pure possibilities, purified, that is, of everything bound to the particular fact and any fact at all. Thus we obtain the eidos as the intuited or intuitable pure universal[.]

(Schuetz 1959: 160-61)

It is the abstract intersection of the variants, the sameness which is the thread connecting the differences, which is the essence (what in Peircean iconic signification would be called the 'qualisign'):

All of these variations have concrete similarities with the same prototype, and the manifold of new images produced in phantasy is permeated by an invariant identical content in terms of which all the arbitrarily performed variations come to congruence, whereas their differences remain irrelevant. This invariant element prescribes their limits to all possible variations of the same prototype; it is that element without which an objectivity of this kind can neither be thought nor intuitively phantasied.

(Schuetz 1959: 158)

The incompatibilities between individual variants serve to reveal the essential sameness underlying the series, but it is precisely the origin of eidetic variation in imagination which constrains the essence which will be found:

What makes the examples genuine variants is their difference, each from the others. Two exemplars at the same specific level will necessarily conflict. Eidetic variation aims at discerning the resemblance which is, in fact, the very ground of all such differences and conflicts. The congruent nexus, eventually recognized as the essence, is first efficacious in the form of a certain "constraint" upon the free play of variation.

(Levin 1968: 5-6)

If, as argued in Chapter 1, we routinely perceive according to concepts we already possess, then eidetic variation is simply a systematic exercising of the unconscious contents 'stored on the backstage of intentionality' (Gallagher 1998: 106) which constrain our perceptions. The products of eidetic variation are the products of our previous experiences and our existing categories—eidetic variation reveals the essence of some concept already possessed by the perceiver:

[... E]ven in the putative purity and freedom proper to imaginary eidetic variation, there seems to be no apodictic guarantee [...] that the variants chosen in a presumably arbitrary fashion are not really, for example, the invisible manifestation of a certain unexamined focus of interest. [...] Might not one's variations suggest themselves according to very different sets of criteria, according to different concepts of what is *important*, among attributes f, g, h, ... n, to a thing's being essentially what it is?

(Levin 1968: 10, italics in original)

The essence which eidetic variation reveals, if we could only recognize it as such, is the essence of our own perceptual sedimentation, and its self-evident nature is evidence of the prejudices of that sedimentation rather than of its necessity. Kane has a similar reservation regarding the supposed objectivity of the Schaefferian sound object:

Experience remains curiously ungrounded in phenomenology's eyes and must be supplemented after the fact with an ideal objectivity. Through a sleight-of-hand, phenomenology covertly places its ontology prior to experience, and then subsequently 'discloses' the ontological horizon *as if* it were always already present—as if *its* ontology made experience possible in the first place.

(Kane 2007: 21, italics in original)

If, instead of assuming the *a priori* existence of essences to be disclosed through the process of eidetic variation, we look directly to experience, what will we find?

6.3.4 Empirical types

In eidetic variation, the concrete individual immanent percept is taken only as an exemplar or prototype, the point of departure—in the process of imaginative variation, experience is put out of play (Schuetz 1959: 164). Is it possible, then, to rather ground abstraction—if not objectivity or essence—in experience? Against the notion of eidetic universals (which are essences) Husserl puts the notion of empirical universals, arrived at not through imaginative variation but through comparison between particular immanent perceptual objects:

[Empirical universals] are not only contingent in the sense that their formation starts from a particular given contingently in factual experience, but also in the sense that the conceptualization proceeds on the ground of comparison with likewise contingently given similarities.

(Schuetz 1959: 159)

Thus the present experience of actual perception might offer a means to escape sedimentations of perception. But the actual perception of musical events will not be a sufficient condition for the listener to be able to perceive novel musical organisations. It is still necessary to contend with Sellars's assertion that 'to have the ability to notice a sort of thing is already to have the concept of that sort of thing, and cannot account for it' (1997: 176). Husserl himself drew attention to the sedimentation of previous experience:

No apperception is merely instantaneous and transient; any apperception becomes a part of habitual knowledge as a permanent result. Sometimes Husserl speaks of the "sedimentations" of preceding experiences. To be sure, these habitual possessions are latent, but this involves that they may be "wakened" or "called forth."

(Schuetz 1959: 150)

Thus, when viewing a (real-world) object in context, its meaning is partly co-determined by the relation between it and other objects in the perceptual field, but also by 'its--mostly hidden--relations to objects which were given to us once in the past, and might now be represented in terms of recollections of various kinds' (Schuetz 1959: 152). Even allowing that music listening is mostly concerned with immanent perceptions supposedly without reference to their transcendent (real-world) cause, we do not escape the habitual recognition of musical concepts which we possess—that is, our habits of listening result in our our assimilation of musical events to those concepts.. We become comfortable with the elements of a style, and are drawn to hear in music those kinds of musical events with which we are familiar—hearing music 'wakens' and 'calls forth' sedimentations of previously-heard musical events. Actual perception of concrete musical events in no way guarantees the possibility of hearing novel musical perceptions.

On the other hand, it may be that some people can imagine novel musical perceptions without having the actual auditory percept before them. This is what we sometimes imagine composers doing, if we assume that they do not always work directly in sound (for example by experimenting with a musical instrument of some kind). One approach that might be used by the composer working in imagination would be to consciously or unconsciously apply heuristics. Margaret Boden gives some examples of heuristics which are used as an aid to creativity, including: dropping constraints, breaking an unsolved problem into smaller problems, thinking of a similar problem which one already knows how to solve, asking what is unknown, drawing a diagram, restating the problem, and considering the negative (Boden 1990: 66). The use of heuristics like these aims at taking thought away from its habitual paths in order to find new ideas. However, it can be seen that such heuristics depend on conceptualisation of the elements of the problem. Even the approach of making a diagram as an analogy of the problem implies that the elements be conceptualised in order to be given a place in the diagram. In general, the explicit (if general) nature of heuristics makes them readily applicable to creative musical composition where elements of style are already conceptualised, or can be conceptualised by the composer. This would be the case, for instance, for the working out of a fugue by Johann Sebastian Bach, or composition in the Classical period using the rules of tonality, or composition by a mature artist with an established style (I do not say that only exploratory creativity is possible in these cases, just that heuristics are applicable because conceptualised elements of style are available).

Boden argues that heuristics can create new conceptual spaces, as when Arnold Schoenberg, with his twelve-tone system of composition, dropped the tonal constraints which had existed in

some form in Western music since the Renaissance (1990: 71). She is explicit, however, in attributing to Schoenberg a conscious identification of the generative rules of tonal music, in order to change them and create a new conceptual space: As she says, 'one cannot utterly reject tonality without knowing what it is', and Schoenberg 'took tonality more seriously than did any of his avant-garde contemporaries' (Boden 1990: 73). In other words, Schoenberg's new conceptual space was constructed in terms of (even if some sense in opposition to) the existing conceptual space. This approach will not of itself create new perceptions. Generative rules which are identified and changed are still generative rules, and not perceptions. Conceivably (and as Boden (1990: 320) notes in her discussion of genetic algorithms as models of creativity) random changes to generative rules are not necessarily creative—evaluation of their worth is required. If musical composition is to produce something that can be listened to as valuable in way which is not simply an intellectual working-out of rules (a real danger which composers do not always avoid), then evaluation of changes to generative rules must be made via aural perception, whether in actuality or in imagination..

Perhaps, for instance, we might attribute to J.S. Bach or to W.A. Mozart the ability to combine in imagination conceptualised atomic elements of musical perception (such as pitches) in different ways which result in the creative production of new (imagined) composite perceptions. It does seem conceivable for instance that a composer might invent a new melody in imagination without needing to hear it in actuality. Assuming that the creative product does not just result from the application of generative rules to produce something different but familiar, it would seem that heuristics provide a way of escaping from sedimented perceptions in the creation of new music in imagination, with however those new composite perceptions depending on sedimented perceptions at a lower, atomic level.

I do not claim a complete obliteration of fundamental perceptual categories in the performance of the hardcore bands I interviewed (which would mean that no sedimented perceptions were available with which to imaginatively construct new composite perceptions)—elements of style and of individual songs are conceptualised by the musicians and can for instance be referred to verbally (albeit the conceptualisations are not normally in the terms familiar to an academy-trained classical or jazz musician). I do however want to argue for a mode of performance where the elements of music performance (what a classical musician might refer to as 'different kinds of phrasing') are not conceptualised and where success or failure in performing creatively therefore does not depend on manipulation of conceptualised elements, whether by use of heuristics or by generative rules of expressive performance.

Certainly, songs will be rehearsed to establish desirable performance parameters to a high degree of refinement. Given this level of competent performance, however, these musicians appeared to be seeking something extra the value of which lay partly in its indefinability. In the interviews I recorded, this was most directly expressed by this statement:

[I]t's a Zen, it's a Zen thing I think. It's something, always through us (as) practising and improvising you kind of get a feeling that – you know you're almost on another level you're almost – you're not conscious of what you're doing, you get to that stage where you're kind of almost like a higher enlightenment kind of thing. It's almost that sort of feeling that you get, that you're not quite sure what you're doing and you're pushed beyond another level.

Ben, bass guitarist, biRdbATh

Similar attitudes have been found by other researchers into popular music performance. Geeves and McIlwain (2009) report this statement from an interview with 'JK', a bassist in an 'indie, alt-folk pop band':

If you're not nervous and [the] crowd is already into it...and if it's a song that you know backwards...you just go into a little bit of a zone.... In that blissful moment it's the same feeling you have when you really enjoy anything I think.... Your body knows what to do, and you just go into this trance.... [...].... It's just bliss.

('JK', quoted in Geeves and McIlwain 2009: 417)

Expressions like 'another level', 'higher enlightenment', 'zone', 'trance' and 'bliss' indicate something other than the enjoyment of executing a competent performance. Similarly, there is sometimes an indefinable connection between band members in performance which is valued:

It is the four of us, first and foremost, trying to create a connection with each other and then that being broadcast to the audience....

('JK', quoted in Geeves and McIlwain 2009: 418)

But that's what you're looking for as – again, the more bands I see, the more that I play in a band, the more I'm always looking for from a live performance, you know, I'm looking for that kind of semi-psyhic ((chuckles)) connection between the band members [...]

Ben, bass guitarist

The musical events to be performed in a hardcore or pop are predetermined, so that creativity, if it is to manifest at all, must manifest in subtle variations of timing, attack, articulation, timbre and loudness. That these—or at least the creative patterning of them which is achieved—are not under conscious control is evidenced by the talk of being in a 'zone', on 'another level', of 'semi-psyhic' connection between band members, and of 'vibe':

In the same way that you can't force a vibe with an audience, you can't force a vibe with a song.

('JK', quoted in Geeves and McIlwain 2009: 418)

Geeves and McIlwain refer to the 'inherent uncertainty' for JK of finding the desired experience in performance, and when it is found, of it being a 'fleeting, nonreplicable creative experience':

A certain quality of performance then, a specific type of experience, a particular type of vibe, can all be aimed for but can never be taken for granted nor guaranteed.

(Geeves and McIlwain 2009: 418)

It seems that this kind of creativity in performance cannot be attributed to imagination of the outcome prior to the performance taking place. Performance of this kind either succeeds in the desired way or not, hence the musicians' insistence on ineffable states ('higher level', 'zone', 'vibe') which cannot be guaranteed in advance. Whether creativity occurs in the very moment of motor production, as I later argue, or whether it can be attributed to a process of just-in-time imagination of phrasing, I leave open at this point.

6.4 Summary

In this chapter I have explored the implications of the immanence of meaning in music. Hearing sound immanently is similar to undertaking a phenomenological reduction of sound. An equivalent term to 'phenomenological reduction' is 'perceptual reduction'. The linking of proximal percepts in audition to their causes in the physical world depends, in part, on cross-modal verification of events and the ability to locate sounds in space. The experience of immersive sound at rock gigs serves to undermine cross-modal checking and directional location of sound sources. However, the complete elimination of extramusical reference of sound events in music is not essential to the perception of patterns immanent in sound.

Exploring the phenomenology of sound through Husserl's immanent essences and Schaeffer's sound objects, I have found that the process of eidetic variation by which immanent essences are revealed in fact reveals the sedimented perceptions of the individual. I have argued that the creation of new musical percepts in imagination depends on the conceptualisation of atomic elements, of which the newly created percepts are composites. The kind of performance creativity which is under investigation in this thesis I claim cannot be achieved in this mode due to the variable elements of performance, or the patterns they make, being below the level of conscious control. In the next chapter, I characterise Husserl's immanent essences and Schaeffer's objective sound objects as observational concepts in order to explore the properties which make them expressions of sedimented perceptions.

7 Conceptualization and music

7.1 Introduction

This chapter first reviews Christopher Peacocke's idea of observational concepts. After discussing some of the implications of the way Peacocke defines visual observational concepts, I put forward a definition which enables their generalization to audition. Peacocke's explication of visual observational concepts is adapted to auditory observational concepts via the central notion of an apprehension synthesised from a number of differing immanent percepts. I note the similarity of this description both to congeneric iconic signification and to Husserl's eidetic variation. I argue that Schaeffer's objective sound objects are observational concepts.

I argue that an individual percept can only be perceived as falling under a concept if the concept is already possessed by the perceiver—that is, all percepts which fall under a concept are sedimented perceptions. Creative apprehension of novel organisations of musical elements can only occur nonconceptually and nonconceptual perception can only occur on the basis of percepts in present experience.

The chapter proceeds to review the debate on theory-laden observation between Jerry Fodor (for theory-neutral observations resulting from encapsulated modules) and Paul Churchland (for the plasticity of perception). I conclude that diachronic modules provide different outputs dependent on the cultural context of development. While it may be argued that differential observations result from experiences over time rather than directly from a theory held by the observer, I argue that such experiences are constructed in the context of the various background theories found within a culture. I discuss examples of this process in relation to music perception.

Finally, I discuss theory-laden observation in music in terms of categorical perception of rhythmic patterns. I argue that the background theory of Western notated music results in musicians categorising and remembering rhythms in terms of simple ratios between durations. The existence of consistently performed rhythms at complex ratios suggests the possibility of a form of nonconceptual perception closely related to bodily action.

7.2 Observational concepts

7.2.1 What makes observational concepts observational?

The term 'observational concept' is Christopher Peacocke's, and the explication of the term in this section is drawn from Chapter 4 of his book *Sense and Content* (1983). The first

requirement for a concept to be observational is that it requires observation. Peacocke, while asserting that the principles of observability can be generalized to other sense modalities, argues his case with visual examples. Thus, to possess the observational or visual concept of a square, it is essential that in normal circumstances a visual experience as of something square gives rise to the judgement that the presented object is square (Peacocke 1983: 90). An observational concept (as Peacocke goes on to argue) excludes theoretical constructs which are not (at least in principle) available to direct perception.

Different perceptual events are assimilated to a single observational concept. Thus, we rarely see square faces of objects straight-on so that what is presented to the retina is actually a square (the prototypical view); and yet we assimilate nonprototypical views (which present eg. an oblong, a rhombus or a rhomboid to the retina) to the concept <square>⁸. I will discuss the implications of this ability to assimilate a variety of perceptual events to a single concept under the two headings of conceptualization and observability, beginning with observability.

Nonobservational concepts may include an observational component. Peacocke's example is an X-ray tube. It is possible that a thinker might possess the concept of <X-ray tube> by having an understanding of (in Peacocke's account) the theory of electricity and how to build an X-ray tube, and for them to have the concept without knowing what an X-ray tube would look like. This person's concept differs from the concept a child might have of X-ray tubes they see at a hospital, which is a concept of things that look a certain way. The point is, that someone might possess a concept of X-ray tubes which encompasses both these senses, and be able to conceive of an X-ray tube which looks entirely different from those with which they are familiar (Peacocke 1983: 91). Although someone can look at an X-ray tube (or some other object) and judge it to be an X-ray tube (or whatever it is) without any process of inference, that capacity is not sufficient to make their concept an observational concept under the current description. A visual concept of a square is the same and necessarily observational whoever possesses it, whereas the concept of an X-ray tube varies with the observer and is not necessarily observational. Peacocke's definition of observability makes it a feature of the concept itself, rather than being dependent on the sophistication of the observer (Peacocke 1983: 88).

Can what I referred to at the start of the previous paragraph as the 'observational component' of a nonobservational concept be counted as an observational concept in itself? To take another of Peacocke's examples, the concept of a tomato requires the concept 'is of the same underlying kind as'; that is, that there may be an underlying structure—for example, its genetic structure—which gives rise to its superficial properties. It is conceivable that a 'fool's tomato' which is manufactured in some laboratory might appear visually (and perhaps in taste and smell) just like a real tomato. Should we admit <tomato-like> as an observational concept, which would simply avoid reference to whether the tomato was a real or a fool's tomato?

⁸I use the notation <square> to refer to the concept "square".

Peacocke argues not, since the knowledge of underlying structure (however we understand it) is part of our experience of the perception of the tomato:

We see tomatoes as *tomatoes*, and not as anything weaker. If the representational content of experience is given by what someone would judge, taking that experience at face value, then our ordinary experiences have a content concerning tomatoes, and not tomato-like objects.

(Peacocke 1983: 93, italics in original)

It is possible, however (Peacocke goes on to argue) that the concept <tomato-like> might become part of everyday usage—perhaps if we routinely encountered both real and fool's tomatoes. Such a circumstance would encourage us to separate our concept <tomato-like> from the concept <tomato>, allowing <tomato-like> an independent status as an observational concept (Peacocke 1983: 93). To perceive an object as <tomato-like> is to exclude (for the purposes of that perception) such non-observational issues as its structure and provenance, ie. whether it is a real or a fool's tomato.

Nonobservational concepts of perceived objects, by contrast, involve a level of perceptual experience which could exist without the nonobservational concept. Thus—leaving purely theoretical knowledge of X-ray machines or anything else aside for the moment—there is a perceptual experience associated with the nonobservational concept <q> which could exist without the concept <q>. That perceptual experience would correlate with the observational concept <q-like> (although, of course, someone without the concept <q> could not possess the concept <q-like>). In Peacocke's words, 'there must be some level of representational content at which that experience could be perceptual even though the object does not fall under that nonobservational concept' (Peacocke 1983: 101). By contrast, for observational concepts, 'if components of an experiencer's representational content containing them are false' then 'there is no more primitive level of representational content which could be true' (Peacocke 1983: 102).

Nonobservational concepts involve a level of theory which is differentiated from that required for observational concepts in terms of what Peacocke calls 'epistemic possibility'. It is epistemically possible that something which is <tomato-like> (an observational concept) is not a tomato (a nonobservational concept). Similarly, reading a milliammeter is not observational of electric current, since the epistemic possibility exists that the subject is perceiving properly but that it is something other than electricity which is causing the pointer to move (Peacocke 1983: 104). Epistemic possibility of this kind does not apply to observational concepts:

It is not epistemically possible for someone who has the concept of squareness that: from all the different angles from which an object may be seen, it is seen as square, his perceptual mechanisms are operating properly, the circumstances of perception (the environment in which the causal processes take place) are normal, the object is constant in shape, and yet that presented object not be square.

(Peacocke 1983: 99)

This property makes observational concepts relevant to the immanent meaning of music. Where sounds refer only to other sounds and not to their physical cause (such as the musical instruments which are their cause), there is no epistemic possibility that a normal perceiver can be mistaken who hears the sounds as instances of an observational concept (provided, of course, that they possess the relevant concept). For instance, a note may be heard as having the properties of a sharp attack and fast decay (similar to a piano tone)—this is an observational concept and the normal perceiver who possesses the concept cannot be mistaken in applying it. However, if the meaning of the sound ceases to be immanent to the sound itself—if, for instance, the concept of 'piano tone' is applied instead—then the possibility exists that the sound was not caused by a piano (but perhaps electronically generated, for instance).

7.2.2 What makes observational concepts conceptual?

Someone who possesses the visual observational concept <square> will see a square surface as square, even when it is viewed from an angle such that the proximal percept (the retinal image) is rhomboid or oblong. The key, Peacocke argues, is the requirement for correlating immanent percepts with movements, which requires some conceptualization of perceptual experience as being produced by objects in a world through which they and the experiencer move (1983: 99). Peacocke argues that, to have the observational concept <square> entails the recognition that some unobserved objects are square:

The theory involved here is not any detailed theory about unobserved objects, but the theory that there are material objects and a space, the former distributed in the latter; which space is also occupied by the thinker himself, and the objects in which cause his experiences. Acceptance of this is partially manifested in the thinker's willingness to suppose that an observational concept which he perceives to be instantiated may be instantiated unobserved.

(Peacocke 1983: 98)

Peacocke accepts that explicit knowledge of theory is not required:

The sense in which someone who is able to judge that unobserved objects fall under observational concepts must be 'judging in accordance with a theory' cannot be that he can state or even that he knows that theory. [...] Such a subject needs only to have experiences which are related to the judgements in the same manner as those of someone who does know the theory[.]

(Peacocke 1983: 99)

Conceivably, someone might possess the concept of squareness as a recognitional concept⁹ which is available to them only in the event of appropriate immanent percepts. It is enough (in the particular case of the visual concept <square>) that the thinker assimilate different presentations to the prototypical presentation. This will require the know-how of the movements which will change the presentation to the prototypical presentation; but that know-how need not necessarily imply even an egocentric conception of space—the movements will produce the effect on the immanent percept, regardless of whether the perceiver has a conception of how those movements relate to either the spatial location of the object or their own position in relation to it. That is to say, such a perceiver will have experiences which are related in the same manner to their judgements of squareness as are those of someone who knows the theory.

7.2.3 Observational concepts in audition

I have already indicated in Chapter 3 that I view Pierre Schaeffer's essentialised sound object as the abstract signified of congeneric iconic signification. I now mean to show that Schaefferian sound objects are observational concepts. First, it is necessary to see how the notion of observational concepts can be transferred from the visual modality to the auditory modality.

How does the requirement of a conception of material objects distributed in space for the possession of a visual observational concept translate to a theory of observational concepts in audition? Peacocke asserts that seeing from different angles can be generalized to other sense-modalities, 'with their analogues of the angle from which the object is seen' (Peacocke 1983: 100). It is not immediately apparent what these analogues might be. Certainly, for taste and smell, the notion of an 'angle' of perception does not transfer. For touch, it might be possible to find something similar to visual angle, particularly since shape is a property available to both sight and touch. What of audition? It is true that if we move around in a space, we may receive somewhat different frequency information from the sound source, due to phase cancellation as it arrives at our ears via different paths. There is even an analogue of the prototypical presentation in vision, since we can orient towards the source of a sound event by the subpersonal calculation of interaural time differences (again, without requiring spatial concepts). Nevertheless, it is not certain that direction is the most relevant variable for auditory

⁹ Where a recognitional observational concept is one that is activated only in the presence of a perception giving rise to it.

observational concepts—sound is only weakly directional, for one thing. Perhaps it is possible to transfer the notion of observational concepts to audition by attempting to make a definition which does not rely on angle of observation?

It seems that for visual observational concepts a concept of space and material objects in it is not required, but only the bodily know-how necessary to underpin the notion that the same thing may look different on different occasions of observation—which perhaps requires that the perceiver has the bodily know-how to change one mode of presentation to another, by changing their position in relation to the object. In the case of an observational concept of a square, different modes of presentation are assimilated to the prototypical presentation in which the proximal percept itself is square. Is it necessary for observational concepts that different percepts are assimilated to the prototypical presentation, or even that a prototypical presentation exists? The example of a square chosen by Peacocke to illustrate the idea of observational concepts is a special case. A square only presents a square proximal image from one angle of view (what I have referred to as the prototypical view). Other views, presenting proximal images of oblongs, rhombuses and rhomboids, are assimilated to the observational concept <square> and therefore might be seen as being assimilated to the prototypical view. Should we generalize the idea that an observational concept assimilates all views to the prototypical view? This hardly seems what Peacocke was aiming for, since each rectangle which could be distinguished from other rectangles by the different proportions of its sides would constitute a different prototypical view and therefore a separate observational concept. Since Peacocke is willing to consider a circumstance in which <tomato-like> could become an observational concept, it appears that he is not proposing that we have an observational concept for every uniquely-proportioned shape. The existence of a prototypical view appears not to be essential to observational concepts.

Freeing visual observational concepts from identification with the prototypical view suggests a more powerful interpretation of the notion. The concept of a shape, such as a rectangle, is an abstraction which is independent of the determinate proportions of any instantiation of it. Even the concept of a square, which does entail particular proportions, is independent of an instantiation at any particular size.¹⁰ This point was famously made by Bishop Berkeley in the introduction to his *Principles of Human Knowledge* (1710: 34-35), where he points out that properties shown to be true of any particular triangle (such as that the internal angles add up to two right-angles) cannot be generalized to another triangle which is different, unless it can be demonstrated to be true for the abstract idea of a triangle. The abstract idea will be independent of any property which can be different for any particular triangle.¹¹

¹⁰ And of course, any the concept of any shape is independent of the colour of the surface on which it appears.

¹¹ Berkeley (1710: 35) actually denies the possibility of *abstract ideas*, but accepts that we can abstract from things (a scalene triangle; Peter) and overlook their particularities to consider them in the abstract

It might be objected that in generalising Peacocke's notion of observational concepts I have glossed over the case exemplified by squares, which can be recognised even though proximal percepts from particular angles do not necessarily exhibit the important properties of being rectangular and equal-sided. It would no doubt be possible to extend a more sophisticated argument to such cases, on the basis of abstraction over movements of the body coupled with particular kinds of changes in the proximally-perceived shape (see eg. Shepard 2001). I have argued that there is no relevant analogue of visual angle in audition; however, a more fundamental reason why kinematic change does not apply to my argument for mental representation in music listening is that it is a feature of the everyday spatio-temporal world, whereas my argument is concerned with the immanent objects of audition.

Peacocke's other requirement for conceptualization is the perceiver's 'willingness to suppose that an observational concept which he perceives to be instantiated may be instantiated unobserved' (1983: 98). The perceiver who can think that an observational concept *C* can be instantiated unobserved can think that their present immanent percept *p* might be an instance of *C*; or, if *C* is a recognitional concept of which they are unaware when it is not present, the perceiver can at least think that another immanent percept *q* (not present) might fall under the same concept that the present immanent percept *p* falls under. The recognition by the perceiver that an observational concept might be instantiated at some other time means that one part of Evans's Generality Constraint is met, that of having being able to apply the concept to other individuals from the one in present perception:

We cannot avoid thinking of a thought about an individual object *x*, to the effect that it is *F*, as the exercise of two separable capacities; [the second capacity] being a conception of what it is to be *F*, which could be equally exercised in thoughts about other individuals, to the effect that they are *F*.

(Evans 1982: 75)

Here, then, is a revised definition of observational concepts, generalised so as to allow the inclusion of other modalities than vision:

- a) Observational concepts are not open to the epistemic possibility of nonobservational concepts; assuming normal circumstances and operation of perception, there is no level of theory which could belie the evidence of perception to make something which appears <*x*-like>, not in fact <*x*-like>.
- b) They are more than a simple immanent percept, that is, a variety of simple immanent percepts are assimilated to a single observational concept.
- c) The Generality Constraint can be taken for granted, as being a property of all concepts.

(as a triangle, a man). The difference is unimportant for my argument.

The Schaefferian sound object seems to fit the points of this definition.

a) Sound objects are not open to the epistemic possibility of nonobservational concepts.

The epistemic possibility which characterises nonobservational concepts is a property of distal sensing from the natural standpoint—and it is just this possibility that the phenomenological reduction is designed to exclude. As noted in Chapter 3, a Schaefferian sound object is only possible when a sound no longer functions as a mediate sign of something else—as an index of an object or event, or as a linguistic symbol—but rather is perceived im-mediately, in-itself (Kane 2007: 18).

b) A variety of simple immanent percepts are assimilated to a single sound object.

Differing immanent percepts are assimilated to a single essentialised Schaefferian sound object:

Synthesised together from a continuum of auditory perceptions, the sound object [...] transcends its particular adumbrations. It has become a specific essence, identifiable as the same across a variety of acts of consciousness.

(Kane 2007: 17)

c) The Generality Constraint is met for Schaefferian sound objects by its being revealed through the process of imaginative variation.

A corollary of the belief that an observational concept could be instantiated unobserved by the perceiver is to be found in Husserl's eidetic variation. The imagined percepts in a series of imaginative variations aimed at revealing an immanent essence can be thought of as imagined instantiations of the concept. The fact that they need not be actual immanent percepts present to the perceiver, and yet be essentially the same, indicates that the essence can be thought of independently of the details of its instantiation in a present immanent percept.

The first of the two requirements of Evans's Generality Constraint is

the capacity to think of x , which could be equally exercised in thoughts about x to the effect that it is G or H [...]

(Evans 1982: 75)

This capacity is demonstrated in eidetic variation by imagining an individual auditory event as having different properties ('thoughts about x to the effect that it is G or H '). The second capacity ('a conception of what it is to be F , which could be equally exercised in thoughts about other individuals, to the effect that they are F ') is demonstrated in revealing the objective essence of the sound object, an objectivity under which fall different auditory percepts occurring at different times. Immanent essences, including Schaeffer's objective sound objects, meet the definition of observational concepts.

7.2.4 Observational concepts in music

We thus have a conception of auditory observational concepts which assimilate immanent percepts which occur at separate times to a single concept. Is it possible to identify observational concepts of this kind in 'common practice' music, involving notes and metrical rhythms?

A musician with a theoretically-trained ear will be able to identify elements of music such as particular types of cadences and chords and other musical objects—these examples appear to fit the definition of observational concepts. There is no level of theory which could belie the evidence of normal perception to make something which is <perfect cadence-like>, not in fact a perfect cadence (given normal conditions and perception). The existence of a large body of music theory, codified in both verbal and music notational terms, should not mislead us here. There may be cases of perfect cadences which are ambiguous, but there is no level of theory which can clarify their perceptual ambiguity—it is the way they sound which makes them perfect cadences, and an attempt to write a perfect cadence is unsuccessful if it produces something which is not aurally recognizable as a perfect cadence. Immanent percepts of musical objects such as cadences vary from instance to instance: instrumentation, pitch class, and register may vary. Also, chords (and therefore cadences) may be voiced differently (that is, the pitch classes necessary to define the chord may be spread over a larger or smaller area of pitch space, and may be in a different order from bottom to top, although the root is likely to remain the same). These different immanent percepts are assimilated to a single concept of the cadence, for those who possess the observational concept.

There are, of course, many musical objects which could be argued in a similar way to fall under observational concepts, and later in this chapter I posit observational concepts of rhythms.

7.2.5 Observational concepts, eidetic variation, and congeneric iconic signification

It will be useful at this point to consider both eidetic variation and observational concepts in terms of congeneric iconic signification. Eidetic variation can be seen as a form of congeneric iconic signification, since the essence of the immanent percept is abstracted by comparing a series of imagined variants which differ in inessential aspects only. Similarly, to perceive an instance of an observational concept is to assimilate to the concept a percept which differs in inessential aspects from other percepts which could be assimilated to the same concept. Both eidetic variation and observational concepts involve only a single percept in present experience. Eidetic variation involves a series of imagined percepts, while an observational concept involves a series of individual percepts experienced on separate occasions.

An individual immanent percept which is perceived as falling under an observational concept operates as the signifier and referent of a Peircean icon. The different immanent percepts which fall under the concept signify by means of resemblance, and they are congeneric in that they are of the same kind. There is not the asymmetrical relation between signifier and referent

as there is, for example, when a drawn map signifies a territory of streets and buildings. Rather, each immanent percept can be thought of as functioning as both signifier and referent. The signified is the abstract similarity between different percepts, each of which is an instantiation of the qualisign but possessing concrete particulars which are inessential to the abstract qualisign.

While it could be argued that the individual immanent percept which serves as the basis for a series of eidetic variations is not, strictly speaking, congeneric with the imagined variants of it, it is certainly true that all of the imagined variants are congeneric with each other. The same principle of mutual reference and the status of each variant as both signifier and referent applies. The abstract similarity between variants which is the signified is in this case the immanent essence. The purpose of imaginative variation, of course, is to establish which of the concrete particulars of the original percept are inessential to the immanent essence.

I argued in the previous chapter that Husserl's immanent essences were subject to sedimentation of familiar concepts and that creative listening—the ability to perceive novel musical organisations or structures—would require congeneric iconic signification on the basis of the actual perception of concrete (not imagined) musical events. In other words, in order to perceive novel musical organisations, the series of immanent percepts from which the apprehension is to be abstracted must be in present experience. The requirement for creative music listening that the immanent percepts which instantiate the abstraction be in present experience, is contrary to the requirement for assimilating an immanent percept to an observational concept, that the perceiver be able to imagine the concept being instantiated unobserved. This is a (perhaps long-winded) way of saying that a single percept can only be perceived as falling under a concept if the concept is already possessed by the perceiver, and therefore is not a novel organisation of musical elements. It follows that to perceive a novel organisation of musical elements entails nonconceptual perception of the novel organisation. Also, that nonconceptual perception, insofar as it remains nonconceptual, will be tied to present experience. The next chapter, Chapter 5, deals with present experience in terms of the properties of the 'specious present', as described by Husserl. Chapter 6 deals with nonconceptual perception. Meanwhile, this chapter continues with the generalisation of the notion of observational concepts, with a view to its application to music perception.

7.3 Theory-laden observation

7.3.1 What is theory-laden observation?

Our knowledge of the underlying structure of tomatoes and other real-world objects is part of the representational content of our perceptual experience. That is, the experience itself represents that there is a tomato before us, our perception of the tomato is direct and does not involve inference (Peacocke 1983: 88,93). And yet Peacocke's account of observational concepts clearly separates what is observational from nonobservational background theory. The

question of theory-laden observation is the question of whether background theory can affect our perceptual apprehensions. Could we on occasion see something as <tomato-like> which is not in fact <tomato-like>, because our knowledge of (eg.) the circumstances in which we expect to find tomatoes misleads our perception? If perceptual apprehensions can be modified according to our knowledge of the world, then observation can be theory-laden. Conversely, if our knowledge of the world and the theories we hold cannot affect our perceptions, then observation is theory-neutral.

Theory-laden observation is often discussed in relation to observation for scientific experiments and the emphasis in the preceding paragraph on perception as evidence of the state of the physical world makes sense in that context. However, the notion of the plasticity of perception applies equally well to observational concepts. In the context of this thesis, evidence for theory-laden observation of observational concepts can be taken as evidence of the sedimentation of perception obstructing the perception of novel musical organisation.

The notion of theory-laden observation or plasticity of perception has been the topic of a widely-cited debate between Paul Churchland (for perceptual plasticity) and Jerry Fodor (for theory-neutral observation). I review first this debate and then Mark DeBellis's (1995) application of the idea of theory-laden observation to music theoretic listening.

7.3.2 Encapsulation and theory-neutral observation

Fodor's argument for theory-neutral observation is tied to his theory of modularity of mind and in particular to the attribute of modularity known as 'encapsulation'. Fodor's idea of modularity is that early sensory systems take sensory input and process it to produce meaningful outputs which are supplied to central processing. Two such systems, visual object tracking and auditory scene segmentation, will be discussed in Chapter 5. There are separate modules for things such as visual shape and visual colour, and a module for language processing. The processing of modules is automatic and mandatory (we cannot choose whether they operate or not)—for instance, a native English speaker cannot hear spoken English and not understand it (Robbins 2009).

The important feature of the theory of modularity on which the argument for theory-neutral observation rests is encapsulation:

A cognitive system is informationally encapsulated to the extent that in the course of processing a given set of inputs it cannot access information stored elsewhere; all it has to go on is the information contained in those inputs plus whatever information might be stored within the system itself, for example, in a proprietary database.

(Robbins 2009)

Encapsulation might be relative to other sensory modalities, but theory-neutral observation requires cognitive impenetrability, encapsulation relative to centrally-held concepts:

Cognitive impenetrability is a matter of encapsulation relative to information stored in central memory, paradigmatically in the form of beliefs and utilities. But a system could be encapsulated in this respect without being encapsulated across the board. For example, auditory speech perception might be encapsulated relative to beliefs and utilities but unencapsulated relative to vision[.]

(Robbins 2009)

If perceptual apprehensions are cognitively penetrable, then observation can be theory-laden. If perceptual apprehensions are cognitively impenetrable, then observation is theory-neutral.

7.3.3 Observational concepts and proximal percepts

It will be clear from my talk of 'perceptual apprehensions', which I have characterised as synthesising a series of proximal percepts, that the possibility of perceptual plasticity due to theory-laden observation relates to this level of synthesis, and not to immanent perceptual events. The level at which plasticity occurs was clarified in the Churchland-Fodor debate. Both agreed that their debate related to perception at the level of synthesis into observational concepts, not at the immanent level:

For one thing, if all Fodor wishes to insist on is uniformity in the character of our sensations through changes in our doxastic commitments, then his argument is largely an ignoratio. It fails to address the major epistemological tradition at issue, whose central theme has always been the theory-laden character, not of our sensations, but of our observational concepts and observational judgments. [...S]ensations themselves neither confirm nor refute any theory. Sensations belong to the wrong logical space: it is only an observation judgment or belief or report that can be logically consistent or inconsistent with any theory[...] Whether sensations themselves might be infected or modified by theory was rarely, if ever, an issue.

(Churchland 1988: 184-85)

Churchland constructs a sensation/judgment dilemma, and then proposes that I impale myself on one of the horns. No thanks. There may be some nontruthvaluable (purely sensory) states involved in perception, but they aren't the output states of modules. To a first approximation, the outputs of modules are judgments about how things appear; judgments which are then up for being interpreted and corrected by reference to background beliefs in the course of 'higher' cognitive processing. The idea is that there are two sorts of judgmental processes (perceptual and higher cognitive) one but not the other of which is encapsulated.

(Fodor 1988: 197)

The point is that the output of modules is distal perception—and other apprehensions which perhaps do not fall under the heading of 'distal perception'. To provide distal perception which corresponds usefully to the objective world, Fodorian modules access sensory inputs and some limited information which is available within the module:

Thus, in the case of vision, a good candidate for accessible background is information about the geometrical relations between three-dimensional objects and the two-dimensional images they project onto the surface of the retina.

(Fodor 1988: 189)

Fodor's formulation of the information available to modules which are inaccessible to central monitoring chimes well with the way Peacocke (1983) divides observational and nonobservational concepts—observational concepts exclude theoretical constructs which are not available to direct perception while maintaining perceptual constancy as produced by distal perception—so that, for instance, different views of shapes are assimilated to the same concept. Similarly, modules encapsulated relative to information held in central memory have access to limited information appropriate to their function but not (Fodor argues) to nonobservational background theory:

By hypothesis, only those properties of the distal stimulus count as observable which terms in the accessible background theory denote. The point is, no doubt, entirely empirical, but I am willing to bet lots that 'red' will prove to be observational by this criterion and that 'proton' will not.

(Fodor 1984: 38)

In particular, Fodor asserts that the kind of theory which might vary between individuals or over time is not available within modules, so that

given the same stimulations, two organisms with the same sensory/perceptual psychology will quite generally observe the same things, and hence arrive at the same observational beliefs, however much their theoretical commitments may differ.

(Fodor 1984: 24-25)

This is the weak point in Fodor's argument for theory-neutral observation. The information accessible to encapsulated modules has not been clearly specified. If it should prove that the set of rules available to encapsulated modules is susceptible to change over time (a failure of diachronic encapsulation), then perceptual plasticity seems possible, at least in some limited sense.

7.3.4 Failure of diachronic encapsulation

In illustration of cognitive impenetrability of perceptions, Fodor (1984: 33-34, 40) offers the Müller-Lyer illusion (see Figure 1). Most people (in Western cultures, at least) see the line labelled *b* as longer than the line labelled *a*. Fodor's explanation for the illusion is that unconscious modular mechanisms interpret the figure labelled *a* as a three-dimensional projection of a convex corner with the edge emerging toward the viewer from the picture plane. The figure labelled *b* is interpreted as a concave corner with the edge receding from the viewer—thus further away than line *a*. Since the proximal percepts of the lines are actually of equal

length, the distal perception is produced which compensates for the effect of perspective and gives us line *b* as longer than line *a*.

As Fodor points out, the perception of unequal length persists despite the illusion being familiar to many people who know that the lines are of equal length and even in the face of certain belief that they are equal (eg. after carefully measuring them). This appears to be an observation, then, that is theory-neutral and not cognitively penetrable.

A distinction can be made between diachronic and synchronic encapsulation. A synchronically encapsulated module would be cognitively impenetrable at short time scales, but its outputs in response to the same stimuli might change over a longer period (perhaps months or years)—this would be a failure of diachronic encapsulation (McCauley and Henrich 2006: 82). A degree of failure in diachronic encapsulation appears to be accepted in the theory of modularity, at least in the sense that some modules develop their function in a way appropriate to the cultural context of the individual. For instance, people learn to speak the language particular to their linguistic environment but share the same underlying grammatical competence, which is perhaps innate (Robbins 2009). The output of such ‘diachronic modules’ (Robbins 2009) develops and changes over time but eventually stabilises in adulthood.

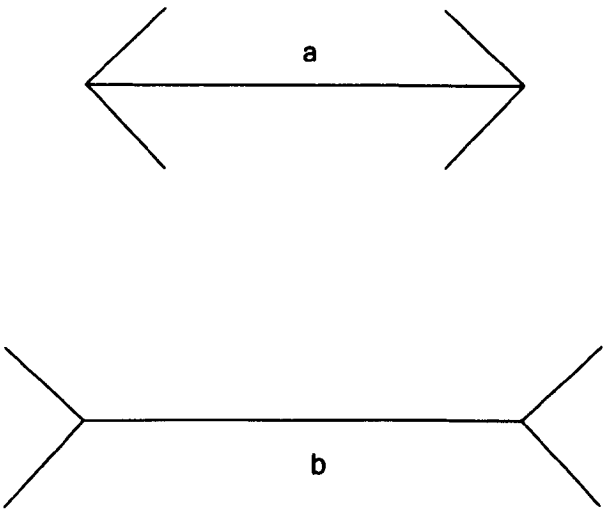


Figure 1 The Müller-Lyer illusion.

The Müller-Lyer illusion appears to be due to the output of a diachronic module. Robert McCauley and Joseph Henrich (2006: 94), citing experimental studies undertaken in the 1960s and earlier, found that adults were typically less susceptible to the illusion than children. An extensive cross-cultural experimental project in 1966 cited by McCauley and Henrich (2006: 93) showed that susceptibility among American subjects in Evanston, Illinois, was the

greatest, while hunter-gatherer people of the Kalahari Desert were practically immune to the illusion. Hypotheses about the cause of the variability in susceptibility to the Müller-Lyer illusion include that exposure to built environments with right-angled corners to buildings during developmental years conditions the visual system to see angles in the proximal image such as those projected by the Müller-Lyer diagram as cues to depth (McCauley and Henrich 2006: 95). According to McCauley and Henrich, such findings are contrary to

[...] Fodor's insistence that how and that input systems are informationally encapsulated are innately specified. He maintains that they are endogenous features of the human cognitive system that are, if not largely fixed at birth, then, at least, genetically pre-programmed; such reliably developing systems are triggered, rather than shaped, by the newborn's subsequent experience.

(McCauley and Henrich 2006: 83)

However, the variability of the Müller-Lyer illusion across cultures seems to be no more striking than the variability of language. Fodor explicitly accepts diachronic penetrability for both the Müller-Lyer illusion and language:

To deny diachronic penetrability would be to claim, in effect, that all the background information that is accessible to modular perceptual systems is endogenously specified, and that is viewed as implausible even by mad dog nativists like me.

(Fodor 1984: 39)

Fodor argues that perceptual processing which is plastic only in response to comprehensive environmental experiences over time is enough to ensure consensus of observation (1988: 192); and that consensus of observation can underpin theory-neutral observation (Fodor 1984: 42; Fodor 1988: 189, 92). But this is not so: as McCauley and Henrich point out (2006: 99) there are some sounds in the English language (/r/ and /l/) between which native Japanese speakers are unable to distinguish. Two different sounds which are distinguishable to one set of people and not to another does not provide for theory-neutral observation.

7.3.5 Theory-laden observation in music listening

Mark DeBellis (1995: 80ff) in his discussion of the possibility of perceptual plasticity in music listening discusses the kind of trained listening which involves consciously identifying heard musical events as instances of concepts from music theory. The kind of listening DeBellis describes—which he refers to as ‘music-theoretic listening’—requires not only that the listener possess the concepts of music theory but that they can identify and label those concepts as they hear them occur. It is more, then, than simply being a competent listener of the musical style being heard: for it to qualify as music-theoretic listening the listener must be actually identifying the concepts as they hear them (I assume that actual verbal labelling is optional under the definition). DeBellis concludes that ‘the effects of musical training are perceptual’ since a trained musician will be conscious of hearing music-theoretic objects (a tonic pitch,

minor triad, etc), a composer will make choices between alternatives heard in music-theoretic terms, and an analyst will produce a music-theoretic description of how they hear a piece of music (1995: 102):. When this kind of hearing takes place, music-theoretic perceptions are prominent in conscious decision making and inference. Also, music-theoretic listeners 'will be able to distinguish reliably, by ear, passages that satisfy such a description from ones that do not' (DeBellis 1995: 102). However, there is nothing in any of this to demonstrate that it is actually perceptions which are involved—that music-theoretic listeners are actually hearing anything different than they did before being trained, except that they are now able to label what they hear according to the definitions of musical theory.

DeBellis's investigation of the potential plasticity of perception in music-theoretic listening is ultimately unsatisfying, since he never really defines how our perception of the music might be changed. Certainly, a music-theoretic listener has a different experience of the music, but it is unclear from DeBellis's argument where we should draw the line between a cognitive and a perceptual experience and whether any differences in the music-theoretic listener's experience will be on the perceptual side of the divide. If theory changes perception only by altering the identification of perceptual objects, this will naturally change the sense of the relationships between the perceived object and other objects of perception. If this is what was meant by the plasticity of perception due to theory, there can be no argument; but that in itself does not belie the ability which Fodor (1995: 85) claims we possess to observe the phenomena of the world as they are from a theory-neutral standpoint. This quote from Naomi Cumming indicates the difficulty:

The issue remains unresolved as to whether a phenomenological change in the way things "seem" actually entails a cognitive penetration of perceptual input in any way that Fodor would recognize. An observation made by Leonard Meyer captures the conundrum well. Before knowing the title of Peter Bruegel's *Icarus*, the small mark in the center of the canvas seems of little significance. After reading the title, the entire appearance of the painting changes. Has perception been penetrated by knowledge? Fodor would say "no"—knowledge of mythology cannot alter the processing of color and shape. Hearing a progression as a linear descent changes the way it seems, but has auditory processing been changed? Again Fodor's view would make it impenetrable to learning.

(Cumming 1993: 50-51)

One might argue that there is a difference in phenomenal experience between hearing observational concepts in music, and not hearing them. This is the kind of experiential difference which attaches to different intentional states. Dan Zahavi (2003: 67), following Husserl, distinguishes the intentional quality of an experience (eg. judging, affirming, hoping, desiring, regretting, and so on) from its intentional matter (what it is about). Both the intentional quality and intentional matter have an influence on the phenomenal experience: Zahavi points to the experiential difference between denying that 'the Eiffel Tower is higher than the Empire State building' and denying (the same intentional quality) that 'North Korea has a viable

economy' (a different intentional matter) (2003: 68). However, these kinds of differences in phenomenal experience are not differences of perception, even in cases where the intentional matter is an object of present perception.

Fodor objects to Churchland's (1988: 179) examples of theory-laden observation in music on the grounds that it may be exposure to experiences which generate both perceptual effects and beliefs (Fodor 1988: 192). Churchland argues that physics students, for instance, may memorize Newton's laws of motion but do not come to see the motions of common objects in a new way until they have practised the skills of applying those laws in a wide variety of circumstances (1988: 176). Similarly, the Western music student trained in a conservatorium is trained to recognize relationships between the pitch classes of the chromatic scale by ear, as well as types of chords (major, minor, seventh, diminished, etc) and chord functions (tonic, dominant and so on). A person so trained perceives 'a structure, development, and rationale' in music 'that is lost on the untrained ear' (Churchland 1988: 176). On the other hand, someone trained to recognize sounds according to their frequency rather than their pitch would come to make spontaneous perceptual judgments that would put them in a position to 'anticipate, manipulate, and exploit' the details of auditory phenomena—they might, for example, learn to easily calculate the speed of a car from the Doppler shift of frequency as it passes (ibid: 180). Against this, Fodor suggests that such effects might not actually flow from the acquisition of beliefs, but rather that the beliefs follow from the perceptual effects of having the experiences. Fodor is obliged to admit that the long-term effects of different experiences on perception constitutes a failure of diachronic encapsulation, but is of the opinion that it is too small to affect observational consensus (1988: 192). I will leave the controversy here. Whether or not perceptions which vary with beliefs but are not caused by them can in general be described as either 'observational neutrality' or 'observational consensus' is an argument I will avoid.

If the status of music-theoretic listening as theory-laden observation remains uncertain, it may nevertheless be true that long exposure to the music of in the context of a particular culture results in perceptions which display an epistemic conformity with the the perceptions of other members of the culture. The schemas which organise those perceptions might never be made explicit but rather would be encoded in practices of learning and doing music—as for example the fact that a certain rhythm tends to be danced to in a certain way within a particular culture.¹² A study carried out by Carolyn Drake and Jamel Ben El Heni (2003) of intercultural differences between French and Tunisian participants in synchronizing with music found that participants spontaneously chose to tap to a slower level within the hierarchical levels of meter with music of their own culture than with music of an unfamiliar musical culture. Similarly, they could synchronize with more of the hierarchical levels of meter in music of their own culture. The effect of familiarity or unfamiliarity with the musical culture from which musical examples were drawn was stronger than the effect of familiarity or unfamiliarity of particular examples within the familiar culture (Drake and El Heni 2003: 435). The authors conclude that 'passive

¹² I am indebted to Prof. Martin Clayton for this example.

acculturation or implicit learning plays an important role in the way in which listeners perceive the music with which they have grown up' (Drake and El Heni 2003: 436). There was less difference between the performance of musicians and non-musicians in the Drake and El Heni study, which used popular songs as examples, than in a previous study which had used classical excerpts as examples (2003: 437)—so it can be assumed that explicit theoretical training of the classical musicians in that study, together with extended practice of the appropriate perceptual skills, also shaped perceptions over time.

It is an unwarranted leap to refer to musical apprehensions which differ according to whether the listener's musical development has occurred within one musical culture or another as 'theory-laden'. However, the example (like McCauley and Heinrich's (2006) example of cultural differences in susceptibility to the Müller-Lyer illusion) militates against diachronic informational encapsulation of the perceptual systems involved.

Churchland's (1988: 179) example of the equally-tempered chromatic scale (the foundation for Western classical music since around the time of J.S. Bach's *Well-Tempered Clavier*) seems to provide an example of the development of perception in accordance with a theory. It is not so much that the frequencies of all pitches produced in classical music conform to the equally-tempered chromatic scale but rather that competent listeners in the style assimilate most auditory experiences of pitch to it. (I say 'most' because special cases such as *glissandi*, for instance, are not assimilated.) The point of the equally-tempered chromatic scale is to allow uniform relations between scale degrees in different keys while remaining within one set of twelve pitch classes. Unless the listener possesses perfect pitch and so is able to identify individual pitches without reference to other pitches, notes within the chromatic scale are heard in relation to other pitches which may be instantiated at perceptibly different frequencies in different cases (a piano may be tuned somewhat higher or lower, for instance, or a record turntable may be running fast or slow). Proximal auditory percepts which do not conform precisely to the equally-tempered chromatic scale (at the absolute pitch as heard in music now playing) are either assimilated to one of the notes of the chromatic scale, or dismissed as being 'out of tune'—not belonging to the scale at all and therefore a mistake of execution. In other musical cultures—such as that of North Indian classical music—pitches do not conform to the equally-tempered scale and a different set of relations holds. It would seem that there would be musical instances which rely on competence within the relevant tradition without in themselves providing the necessary experiences to develop that background knowledge. For these instances, a musician from another culture, trained in accordance with a theory which lacked the background knowledge of how different pitches relate, would presumably synthesise an apprehension of the passage quite different from that of a musician from within the culture which produced the musical passage. Is this truly an example of theory-laden observation, though? It could be argued that the effect on observation is at least partly one of enculturation (like the example of Tunisian and French perceptions of music, and of the one of the Müller-Lyer illusion). Certainly, there is the explicit theory equal temperament to point to, but it seems that the direct effect of the theory is on the kinds of experiences which listeners have and that it

is those experiences which shape perceptions. The division is not clear-cut, however: does the experience of being told that a given note is 'out of tune' count as enculturation or the effect of the theory?

7.4 Categorical perception of rhythm as theory-laden observation

7.4.1 Categorical perception of rhythm

I have discussed apprehensions and observational concepts in terms of relations between proximal perceptual events. I now want to discuss in detail an example of theory-laden observation in music which is explicitly to do with relations between percepts. That is the categorization of rhythms in terms of relative magnitudes—in other words, in terms of proportional durations between attacks in the rhythm.

Listeners to music do not perceive rhythm on a continuous scale. Instead, rhythmic categories are recognized which function as a reference relative to which the deviations in timing (so-called expressive timing) can be appreciated[.] It is amazing that listeners can quite easily quantize (i.e. extract discrete rhythmic categories from) a musical performance, while memorizing and reproducing the discrete rhythmic structure, may not even be aware that there were such large deviations from mechanical timing.

(Desain and Honing 2002)

This quote appears to describe a situation whereby proximal perceptions of rhythmic events are remembered and reproduced in terms of conceptualised versions to which the proximal percepts are assimilated. Of course, this is just how I have described observational concepts in general.



Figure 2 Stimulus format for rhythm categorization. Adapted from (Desain and Honing 2003)

Peter Desain and Henkjan Honing (2003) undertook an investigation of rhythm which systematically explored all possible temporal patterns of four onsets within a fixed duration, giving three interonset intervals with durations in various ratios. Participants were asked to think of the stimulus as though it were played by a percussionist, and to 'notate the score they thought was most likely used.' The variation of interonset intervals was essentially continuous, although quantised to a fine grid with 19 divisions available within the fixed duration of one second. The smallest actual interonset interval was 158 milliseconds, although the quantisation allowed differences between interonset intervals as small as 53 milliseconds. Each pattern was

presented three times (in the format shown in Figure 2) after which the participants used music notation software to notate the rhythm they thought the ‘percussionist’ was reading.

Desain and Honing analyse the data obtained in various ways, but the central finding was that the notated rhythms most often given by the participants were equivalent to ratios including at least one interonset interval which reduced to one in relation to the other two intervals. The proportional durations of the notated rhythms thus usually included at least one interval of 1 unit with the other intervals comprising various combinations of 1, 2, 3 or 4 units. Most of the commonly-made categorizations fit either a duple or triple meter, with more complex ratios being assimilated to a nearby rhythm in one or the other meter. Desain and Honing (2003) also ran versions of the experiment in which either duple or triple meter were primed with subdivisions in the bar prior to presentation of the rhythms. The presence of one meter rather than another affected the frequency of particular categorizations: for instance 1-2-1 being ‘almost impossible to recognize’ in triple meter, while 1-3-2 is easier when primed by triple meter but ‘almost disappears’ when primed by duple meter. Particular stimulus ratios are categorized differently according to the primed meter, for instance [210:474:316] in a duple meter context was categorized as 1-2-1 in 64% of responses, but in a triple meter context no participant categorized it in this way.

7.4.2 Background theories of meter and rhythm patterns and observation

Of course, perception of meter depends in the first instance on beat perception. The perception of an isochronous beat within a train of auditory stimuli (which might not mark every beat and some of which may fall between beats) is a property of the phenomenon of entrainment. Entrainment by humans at musical rates is thought to depend on endogenous oscillators in the brain (Clayton, Sager et al. 2004; McGuinness 2005). It follows that the effect of meter perception on the perception of interval ratios in rhythms cannot be directly characterised as theory-laden observation—although it does appear, incidentally, to support some idea of plasticity of perception which does not depend on theory.

Nevertheless, the choice of what meter to hear in a given rhythm is to some extent under conscious control: a trained musician can consciously choose to hear at least some rhythms as fitting different meters. In Desain and Honing’s experiment, meter was induced, but there are other cases in which cultural expectations provide a theory which is missing for someone who is not a competent listener. Thus, Iyer (1998) gives examples of Western musicologists mistakenly ascribing different meters to instances of traditional African drumming, and cites the testimony of a master drummer in the style that a competent listener is expected to hold to a four-beat, even—or especially—when it is least evident in the musical texture. Another example: traditional African drumming sometimes marks the macroperiod boundary using a rhythmic pattern organized over 12 pulses, with translational symmetry only at the level of the whole pattern. In different cultures, a different point in the pattern marks the start of the macroperiod, and drummers from different cultures cannot play together successfully without first agreeing on which theory to apply (Seifert, Olk et al. 1995). These are clear examples of

theory-laden observation of meter. Since Desain and Honing's (2003) experiment showed that different metrical perceptions of the same passage can produce different perceptions of the rhythms of which the meter is composed, then the effect of theory on meter perception produces theory-laden observation of rhythms.

Influences of metrical perception aside, within the Desain and Honing study itself I would argue that the music notation requirement of the experimental task and the theoretical training of the participants combined to produce theory-laden observation. Numerical ratios, and simple ratios in particular, are built into the system of notation and the theory it expresses. The beat level of duration has no particular music notation corresponding to it: a quarter note duration might represent the tactus in one situation, and in another situation represent only half a beat period. Music notation of durations is itself based on a system of duple subdivisions, with ternary relations and more complex ratios represented by an awkward system of dots added to the basic note head shapes. The simple ratios of hierarchical meter perception appear to be due to the limited range of beat periods to which we can entrain musically (McGuinness 2005). It is conceivable that the simple ratios which naturally emerge in hierarchical meter shaped the Western musical notation system and that the Western musical notation system in turn shaped the rhythms available in notated music.

Empirical investigations of rhythm categorization often rely on music notation and on participants trained in music notation. The implicit assumption that all rhythmic durations are defined by mathematical subdivisions of the pulse is often encountered in the literature; sometimes it is made explicit:

This is the functional gate to a fundamental structural feature of human rhythmic music, namely the fact that its temporal elements are based on subdivision and multiplication of the unit duration of the tactus, yielding the "durations with proportional values" basic to musical rhythmicity [...]

[T]he isochronous pulse or tactus supplies a time-base that defines – most directly – a *tempo* and through it all durations entering into the rhythmic patterns of the music, rendering those durations proportional (by subdivision and multiplication of the unit duration)[... Rhythmic patterns] are higher order entities composed of durations obtained by subdivision and multiplication of the unit duration of the musical pulse

(Merker, Madison et al. 2009)

Needless to say, the existence of an isochronous pulse does not necessitate that rhythms at shorter timescales than the basic beat involve durations proportional to the beat period (except in the trivial sense that any pair of durations can be expressed as a ratio with high enough numbers)—examples are the practice of *inegale* in Baroque music and the complex swing ratios found in performances of jazz.

Without the use of numerical ratios, however, it is difficult to see in what terms durations could be categorized relative to other durations. Relationships between durations, defined in terms of

ratios (whether mediated by music notation or not) may be the means by which rhythms can be conceptualised so that they can be remembered and repeated. Immanent percepts of rhythms with ratios which are too fine-grained to match existing observational concepts are assimilated to a simpler ratio—similar to the way in which we generalise over the specific proportions of rectangles to assimilate them to the observational concept of <rectangle>. In both cases, the specific proportions are not part of the concept. Theory-laden observation occurs where the background theory specifies the kinds of ratios available (as in the different kinds of ratios specified in Western notated art music theory and North Indian classical music theory, with its finer explicit gradations of rhythm), or where background theory indicates one meter rather than another and that affects the ratio to which the immanent percept is assimilated. These are cases of sedimented perception, whether due to an explicit belief or a history of perceptual experience of particular kinds.

An interesting attribute of rhythms at sub-entrainment rates which are conceptualized in terms of ratios is that they conform to the Generality Constraint. Evans's Generality Constraint notes that possession of a concept entails that the subject be able to think of objects of perception and their properties separately. Where a rhythmic pattern is the object of perception, one of its properties which can be changed is the tempo at which it can be instantiated. A rhythmic pattern conceptualized as a set of ratios can be reproduced in any tempo at which it is possible to entrain and in which it is physically possible to play the rhythm.

A study led by Bruno Repp (using Western musicians) found that rhythmic patterns where the ratio between interonset intervals was complex (ie. where it did not reduce to 1 on either side of the whole-number ratio) were not reproduced accurately (Repp, London et al. 2005). The rhythms produced by participants did not match the complex-ratio templates provided, but they did produce consistent complex-ratio rhythms (without conceptualizing the ratios). The researchers concluded that a quite different means of rhythm control other than relational patterns is at work at this temporal level:

The particular interval ratios produced at fast tempi may be a consequence of the kinematics of the rhythmic gestures and/or of perceptual distortions (i.e., assimilation) in interval perception. [...] Our participants may have been forced into a mode of operation that resembled more the action-driven rhythms of West Africa than the rational hierarchical schemes of Western musical thinking.

(Repp, London et al. 2005: 75)

The important dichotomy here is not a simplistic one between two musical cultures, but between percepts which can be conceptualised and those which are closely related to bodily performance, a distinction which is investigated in more depth in Chapters 6 and 7.

7.5 Summary

This chapter has adapted the idea of observational concepts to immanent meaning in music. The perception of immanent meaning in music is observational, since no nonobservational level exists at which a normal perceiver possessing the appropriate concepts could be mistaken if they hear some immanent meaning as falling under particular concept. Peacocke's description of visual observational concepts was generalised by deleting the requirement for conceptualization of an implicit conception of physical space (which does not translate easily either to auditory perception in general or to the immanent perception which I have argued is fundamental to music listening) and instead relying on the ability to believe that the concept could be instantiated unobserved. This requirement can be restated in terms of Evans's Generality Constraint. Husserl's immanent essences also conform to the Generality Constraint, in that the imaginative generation of variants requires the ability to believe the immanent essence could be instantiated in a percept different from the present one.

In conforming to the Generality Constraint, both observational concepts and immanent essences rely on a concept which was formed before the current application of it. Neither observational concepts nor immanent essences can therefore be the outcome of present creative listening. It follows that the abstractions of creative listening do not conform to the Generality Constraint and must be nonconceptual. It might be argued that meeting Evans's Generality Constraint is necessary but not sufficient for an ability to be conceptual, that is, that there might exist nonconceptual abilities which meet the Generality Constraint. If there are, and if my arguments in this chapter hold, then creative listening to music is not one of those abilities. Nevertheless, if it is accepted that meeting the Generality Constraint is a necessary property of conceptual abilities, then creative listening which does not meet the constraint entails nonconceptual perceiving.

I have argued that observational concepts and eidetic variation are kinds of congeneric iconic signification, involving a series of immanent percepts. The series of immanent percepts which function as both signifiers and referents in iconic congeneric signification in the perception of observational concepts are the single present immanent percept plus the other immanent percepts which have been perceived at other times as falling under the concept. The series of immanent percepts in eidetic variation are the present percept and the imagined variants. Previously perceived and imagined percepts already fall under the concept in question. For this reason, nonconceptual hearing in music must involve immanent percepts in present experience.

The Schaefferian objective sound object is argued to fall under the description of observational concepts.

Apprehensions, and observational concepts in particular, are abstractions from proximal percepts, and the question arises whether such abstractions emanate from subpersonal modules which are encapsulated from central processing, or whether the system of beliefs held by the observer can influence apprehensions. Reviewing the debate between Fodor and

Churchland on theory-neutral observation *versus* the plasticity of perception, I have argued that the diachronic modules responsible for language and for the Müller-Lyer illusion produce different outputs according to the culture in which the subject is raised. Outputs are constrained by module function and constrained (but not determined) by the physical world. The plasticity of perception may be due to repeated experiences of a particular kind rather than to the direct influence of theory.

A particular example of theory-laden perception in music is provided in the categorical perception of rhythmic patterns by which complex-ratio patterns are assimilated to simpler ratios. The simple ratios conform to Evans's Generality Constraint in that they can be reproduced at different tempos. Stability in performance of apparently unconceptualized complex-ratio rhythmic patterns suggests that some mechanism for nonconceptual perception exists, possibly related to motor production of rhythms.

If apprehensions abstract relations between different proximal percepts, the issue might be approached more fruitfully in terms of nonconceptual relational perception. The next chapter looks more closely at how abstraction occurs and argues for nonconceptual perception in terms of relational perception.

8 Present experience

8.1 Introduction

In the previous chapter, I argued that the perception of novel musical organisation entails nonconceptual hearing. I also argued that nonconceptual hearing of immanent meaning in music requires a series of perceptual events in present experience, functioning as congeneric iconic signs. This chapter investigates the capacities available to perception in present experience.

I begin with Husserl's phenomenology of time consciousness. Husserl (1991) identifies various features of our experience of the present which are pertinent to our experience of music—I provide an overview of Husserl's work on the topic, focusing in particular on the continuing identity of an object through different perceptual apprehensions of it.

The ability to perceive a continuing identity, without the need for identification and independent of any changes in its properties, is a key plank of the argument of my thesis. I approach the issue of 'identity without identification' first from an analytic philosophy perspective, through Fred Dretske's (1993) distinction between 'thing-awareness' (awareness of an object of perception) and 'that-awareness' (awareness of some concept in relation the object of perception). Dretske's discussion of levels of conceptualisation leads him to ask whether in fact we require a lowest-level concept, that of <object> or <event>.

Correlates of the continuity of identity of objects and events of perception, independent of their perceived properties, have been found in the psychology of vision and audition. Zenon Pylyshyn's (2007) experiments in visual object tracking have confirmed the existence of a proto-concept (rather than a full concept) for objects of visual perception. A proto-concept of an object in the visual field allows the selection and tracking of the object through various changes in its properties and without the need for identification (even at the lowest conceptual level of <object>). The mechanisms by which selection and tracking are achieved are evidently at a subpersonal level and encapsulated—that is, not available to the conscious awareness of the subject. I argue that these mechanisms underpin the phenomenological experience in visual perception of identity without identification.

Similar work to Pylyshyn's experiments in visual object tracking had already been carried out by various researchers in the auditory field. That work on 'auditory streaming' was brought together by Albert Bregman (1990). The fundamental difference between visual tracking and auditory streaming is that our vision is of objects which endure (or not) through time, while audition is always of events, which by their nature have different temporal parts.

8.2 The phenomenology of time consciousness

8.2.1 Temporal consciousness

The time of the atom, the time of the god, are not what we (the mind that synthesizes, but not everything) experience as temporality.

(Lyotard 1991: 160)

The key word in the quote from Lyotard's reflections on time is 'experience'. The human organism processes events at a temporal level well below our experience of time, for instance synthesizing vibrations at thousands of cycles per second into the experience of pitch. Similarly, we construct cognitive representations of events over larger time scales at which we cannot directly experience temporal order. If we remember seeing something but not when we saw it, we may remember that we were (for example) on a bus at the time, and so fix the seeing within a global sequence of events. However, neither the separate vibrations at millisecond level nor the whole sequence of a day's events are directly available to consciousness.

Nevertheless, we do have direct experience of order and succession. Shadworth Holloway Hodgson (*Philosophy of Reflection* 1878) argued that consciousness necessarily occupies some definite duration, now matter how minimal:

The minimum of consciousness contains two different feelings. One alone would not be felt. [...] The simultaneous perception of both sub-feelings, whether as parts of a coexistence or of a sequence, is the total feeling, the minimum of consciousness, and this minimum has duration.

(quoted in Andersen and Grush 2009: 293-94, italics in original)

Unless the temporal interval which embraces the two successive sensations is integrated in consciousness, they cannot be experienced as a sequence. The essential problem of the specious present revolves around two attributes which together form an apparent paradox: sensory contents of a durational extent are perceived as being in the same present, and at the same time are perceived as arriving in succession.

The fact that the stimulus endures still does not mean that the sensation is sensed as enduring; it means only that the sensation also endures. The duration of sensation and the sensation of duration are two very different things. And this is equally true of succession. The succession of sensations and the sensation of succession are not the same.

[...]

It is conceivable that our sensations might endure or succeed one another without our knowing anything about it at all[.]

(Husserl 1991: 12)

We are, of course, usually conscious of sensations enduring and succeeding one another, and it is the phenomenology of this experience which Husserl (1991) sought to describe in his *On the Phenomenology of the Consciousness of Internal Time*.

8.2.2 The paradox of the specious present

Our sense of the now, of present experience, seems to have a duration of some indeterminate extent. This 'thick' sense of the now Husserl (1991) refers to as the 'specious present', a term which he took from William James's (1891) *Principles of Psychology*. James famously characterised the specious present as a 'saddle-back' over which time flowed. The passage is worth quoting in full:

In short, the practically cognized present is no knifeedge, but a saddle-back, with a certain breadth of its own on which we sit perched, and from which we look in two directions into time. The unit of composition of our perception of time is a duration, with a bow and a stern, as it were—a rearward- and a forward-looking end. It is only as parts of this *duration-block* that the relation or *succession* of one end to the other is perceived. We do not first feel one end and then feel the other after it, and from the perception of the succession infer an interval of time between, but we seem to feel the interval of time as a whole, with its two ends embedded in it. The experience is from the outset a synthetic datum, not a simple one; and to sensible perception its elements are inseparable, although attention looking back may easily decompose the experience, and distinguish its beginning from its end.

(James 1891: 609-10, italics in original)

James is explicit in asserting that we experience the duration as a whole—'We do not first feel one end and then feel the other after it'. The difficulty then arises as to how consciousness manages to experience a duration as integrated, without losing all sense of succession. To put this another way, our experience of the specious present includes an experience of pastness. Husserl identifies the paradoxical implication of that fact:

The primary contents that spread out in the now, *are not able to switch their temporal function*: the now cannot stand before me as not-now, the not-now cannot stand before me as now. Indeed, if it were otherwise, the whole continuum of contents could be viewed as now and consequently as coexistent, and then again as successive. That is evidently impossible.

(Husserl 1991: 334-35, italics in original)

Husserl therefore rejects the notion that the sense-contents are present in consciousness for the whole duration of the experienced present. Husserl points out that our consciousness of past events is not a consciousness of real and present sensory impressions:

If [the individual tones of a melody] were to remain unmodified, then instead of a melody we would have a chord of simultaneous tones, or rather a disharmonious tangle of sound, as if we had struck simultaneously all the notes that had previously sounded.

(Husserl 1991: 11)

An alternative to the idea that we have persisting experience of sensations which are not occurring now is that we simply remember what is just past. Sir William Hamilton (*Lectures on Metaphysics and Logic Vol. 1* 1861) had suggested that it is memory which integrates experiences in consciousness which are spread through time:

For without memory our mental states could not be held fast, compared, distinguished from each other, and referred to self. Without memory, each indivisible, each infinitesimal, moment in the mental succession, would stand isolated from every other,—would constitute, in fact, a separate existence.

(as quoted in Andersen and Grush 2009: 292)

But representation in memory will not do, for two reasons. First, no matter how finely we slice time, until we arrive at point-consciousness there is always some integrated duration—which is just what we are trying to account for, so we cannot take it as given. Second, a memory of temporally extended events has the same kind of temporal structure as the original which means that it will take the same temporal course in the replay, leading to exactly the difficulty which the invocation of memory is supposed to remove. The fact that we can mentally reproduce a sequence of events, and even alter the sequence in our minds, indicates that we have the capacity for consciousness of a temporal duration and of the sequence in which its contents occur. For this, neither memory nor persisting sense-contents will do the job.

8.2.3 Husserl's retentions and protentions

Husserl's description of our experience of the present replaces the unsatisfactory notions of memory and persisting real sense-contents with the idea of 'retentions' of what has passed. Retentions comprise neither persisting sense-contents nor memory of sense-content, but an intentionality towards past sense-contents. Husserl agrees with James in describing the specious present as a finite duration which integrates intentionalities toward both the past

(retention) and the future (protention—although protention is never treated in any depth by Husserl). As Husserl's commentators view it, retention represents exactly what we experience: the sense of just-having-had a sensory impression which preceded the current sensory impression:

Retention, for example, simply *is* the consciousness of what is just past and does not include in itself any present content, not even an echo of what is past.

(Brough 2005: 522, italics in original)

We do not hear the retention of a previous note, for example, we hear the present note as following the previous one.

(Gallagher 2003: S3.2)

Retention is how we can become aware, not only of what is past, but of its 'pastness', as it were¹³. Husserl describes retentions first as a series of ordinates in a chain of points representing past now-points. Husserl refers to each time-point as a 'phase':

Each phase, by being retentionally conscious of the preceding phase, includes in itself the entire series of elapsed retentions in the form of a chain of mediate intentions[.]

(Husserl 1991: 122)

The ordinate for each phase contains the sense data (in the example of a continuing tone, for instance, this would include pitch, timbre and loudness) appropriate to its place in the time-continuum. As each new now-point arrives, a new retentional ordinate is created from the just-past now-point and added to the train of retentional ordinates. The train of retentional ordinates is apprehended in each new now-point along with the real sense data of the now-point, as a whole. Thus, what is retained is not the previous now-point, with its retentions, but rather a retentional trajectory into which the previous now-point has been assimilated. As Husserl puts it:

Every actually present now of consciousness, however, is subject to the law of modification. It changes into retention of retention and does so continuously. Accordingly, a fixed continuum of retention arises in such a way that each later point is retention for every earlier point. And each retention is already a continuum.

(Husserl 1991: 31)

On the other hand, perhaps the sense data in the now-point conflicts with what we have in retention. In that case, we would have retentional modification in which the actual sense data retained were revised in light of new data. Imagine you are sitting in a train stopped at a station, and you see, from your motion relative to the train next to you, that you are beginning to move off. As your window passes the end of the other train, you have a sudden surprise—almost like a physical jolt—as your perception adjusts to the fact that it was the other train

¹³ I am indebted to David Roden for this phrasing.

which was moving, and that your train is still stationary. An experience such as this emphasises the meaning nature of perception. What we perceive in such a case is not just sense data—motion of light and colour in our visual field—but objects and events in a perceived context of meaning.

8.2.4 Properties of the specious present

There are three properties of our experience of the present which are germane to my thesis. They are: the experience of movement or succession; the ability to consider a sequence of perceptual events as a whole; and the continuity of identity of an object of perception.

The experience of movement or succession, as noted at the beginning of this section, is available only within a delimited range of speed of movement. Sean Kelly cites Locke's contrast between the passage of a 'cannon-bullet' through opposing walls of a room (where the succession is too fast to be experienced as such) and the movement of the shadow of a sundial (where motion must be inferred by remembering where the shadow was in relation to where it is now) (2005: Sec.4). Somewhere between these two speeds of movement lies the range where movement and succession are directly available to perception, as when we see the second hand of a clock move, or hear several musical notes in succession.

Beyond the experience of succession, the ability to grasp the whole of a sequence at once is essential to music listening:

Thus, for example, a discrete succession can be held together without prejudice to the nonsimultaneity of its members by a bond of consciousness, by a unitary act of apprehension. That several successive tones yield a melody is possible only because the succession of psychic events is united "at once" into a total formation. They are in consciousness successively, but they fall within one and the same total act.

(Husserl 1991: 22)

Importantly, the apprehension of a complete sequence (a musical phrase) yields another level of meaning, arising from the ability to perceive both the order of the events which the sequence comprises and the relationships between them. The tones of a melody

form a successive unity with a common effect, the apprehension-form. Naturally, the latter is consummated only with the last tone. There is, accordingly, a perception of unities that succeed one another in time, just as there is a perception of coexisting unities; and since that is the case, there is also a direct apprehension of identity, equality, similarity, and difference.

(Husserl 1991: 22-23)

A melody exhibits a variety of relationships at different temporal levels, involving similarities between small rhythmic-melodic cells, contrasts of melodic contour, implied harmony and key, and so on. It is a property of our experience of the present that we are able to synthesise a

perceptual whole—the melody—on the basis of the relationships between its component elements.

The third property of our experience of the present which I want to note is one which underpins the synthesis of a series of perceptual events into a whole. That property is the identity of an individual object of perception which endures through changes which occur in its properties. I noted in the previous chapter that Husserl discovered a phenomenological continuity of identity in successive adumbrations of a single physical object, such as a table. Through the changing percepts, 'Only the table is the same, known as *identical* through the synthetic consciousness which connects the new perception with the recollection' (Husserl, E. 1928. 'Ideas', as quoted in Kane 2007: 16). As Husserl recognized, the continuing identity of an object of perception is separate from a momentary 'intuition' or apprehension of it:

The individual is *not discoverable* in intuitive representation; complex of qualities, *continuously* changing, but in the *continuity* of change we "confirm" identity. (The confirming is naturally not the finding of content.)

(Husserl 1991: 253, italics in original)

This particular property of the specious present is key to my argument in the following chapters. The continuity of identity of a perceptual object is not dependent on the perception of its properties; rather, the continuity of identity from perceptual moment to perceptual moment is given and acts as a vehicle for properties which can then be compared between different moments. It thus provides the basis for Husserl's perceptual adumbrations leading to the transcendent perception of a real-world object (as discussed in Chapter 3), as well as the perceived unity of a succession of individual tones which is the basis of their synthesis as a melody. Empirical investigation has discovered corresponding continuities of identity of objects of perception in the psychology of vision and of audition, and these are dealt with in some detail below. The gratuitous continuity of identity is important for my argument because it establishes the possibility of an open intentionality, a coherence between successive perceptual moments which is not dependent on perceived properties, thus leaving the way open for a synthesis of percepts into a novel apprehension—the mechanism which it is the goal of my thesis to describe.

8.3 Identity without identification

The phenomenon of the perception of continuing identity of an object of perception through different perceptual events which differ in their properties can be recast as an issue of 'identity without identification'. Where an object of perception has been identified on the basis of some of its properties, it can be re-identified in the same way (provided those properties remain unchanged). In this case, the identity of the two objects is inferred. Husserl's example, on the other hand, of the continuing identity of the table which the observer experiences despite different immanent perceptions of it, does not depend on perceived properties, or identification

or re-identification of the object of perception—it is identity without identification. It is this idea I want to explore in this section.

8.3.1 Thing-awareness and fact-awareness

Fred Dretske (1993) distinguishes between *thing-awareness* and *fact-awareness*. Someone can hear or see a piano being played without knowing, believing, or judging that a piano is being played: this is 'thing-awareness' of a piano being played. On the other hand, someone who comes to believe that a piano is being played without hearing or seeing it being played (perhaps because they are out of sight and hearing, of a performance that they have been told is going on) has 'fact-awareness' of the event. The point that Dretske wants to make about the difference between these two states is that thing-awareness is a concept-free mental state—an experience—while fact-awareness is a concept-charged mental state (it might be, for instance, a belief). We can be aware of someone playing the piano; or we can be aware that someone is playing the piano. Thus, to have a sensory experience of something (say, of burning toast) is to be (perceptually) conscious of it; while to have sensory experience that the toast is burning is to be or become aware of a fact.

Someone who is conscious of a fact (eg. that they are hearing a cadential formula in a Classical concerto, or more generally, that x is F) necessarily has the concept F and applies it in their awareness of x . Someone without the concept <armadillo>¹⁴ (to use Dretske's example) can still have a conscious experience of an armadillo; and someone without the concept <cadential formula> can have a conscious experience of a cadential formula when listening to a Classical concerto. In both cases, there is thing-awareness (of an armadillo, of a cadential formula). What thing-awareness picks out is the object of perception (whether a physical object or an event), perceived as something unitary in itself (whatever connections it may have to objects and events surrounding it in space and time). Of course, this raises the question of how the object or event can be individuated and demarcated as separate from whatever objects or events surround it in space and time—this question will be postponed until the sections on continuing identity in visual and auditory perception, respectively, below.

8.3.2 The most basic concept

The possible concepts for any object or event perceived do not need to be possessed by the perceiver. Perception without any of the possible concepts for the thing perceived is by definition nonconceptual. However, there is a sense of 'nonconceptual' which is in common use (eg. in DeBellis 1995) and which I want to differentiate from thing-awareness. For convenience, I will label this special sense of nonconceptual 'nonconceptual_s'. The distinction is

¹⁴ The notation <> around a word indicates that it denotes a concept possessed, so that 'Dretske saw an <armadillo>' means that he was fact-aware of the armadillo, while 'Dretske saw an armadillo' means he was thing-aware of it.

tricky to make clear, but important for my argument. It is perhaps best approached through a consideration of what it does mean to have a nonconceptual_s perception of something.

In my example above of the cadential formula, there are three levels of response which I want to untangle. First, there is the conceptual response: a trained music analyst hears the cadential formula, recognizes its function within the concerto movement, and identifies it as a <cadential formula>. The music analyst definitely perceives the cadential formula conceptually, they have that-awareness of it.

An enthusiastic listener without formal training might hear the passage differently, not having the concept <cadential formula> but nevertheless responding to its occurrence appropriately with the expectation of the final cadential passage of the movement (for which they also do not possess the concept). The enthusiastic listener described does not recognize the cadential formula and does not identify it with similar passages in other Classical concerti they have heard. Responding to it appropriately without identifying it depends on their having a nonconceptual_s perception of it.¹⁵

According to these descriptions of conceptual and nonconceptual_s perception, thing-awareness is neither of these. Thing-awareness is simply awareness of some thing—the properties of the thing (object or event) perceived do not enter into it.

Given that the possible concepts of any object or event perceived do not need to be possessed by the perceiver, it follows that the perceiver may possess some of the possible concepts of the thing perceived, but not others. We can conceive of two people who see the same object, one of whom has a higher level concept of it, and the other with a lower level or more general concept of it. Take the example of a child and a radiologist looking at an x-ray machine: one will have the concepts related to the machine's workings and its use, while the child might have only the concept 'hospital machine', and other lower level concepts such as <made of metal>, <big>, and so on. Or in music, one listener might have the concept <final cadence in the home key>, while another might only have the concept <cadence>.

We constantly change conceptual levels, for instance when we focus on some detail of an identifiable object; or conversely overlook the details but grasp the concept of the object as a whole. For instance, we might focus on the spokes of a wheel, or we might see, immediately, a wheel without being able to say afterwards whether it had spokes or was solid. Carrying the idea of thing-awareness through to its logical end, Dretske (1993: 268) affirms that there is no property *F* 'such that an awareness of a thing which is *F* requires an awareness of the fact that it is *F*'. It is possible to see an object and not be able to classify it at all ('one can surely mistake an animal for a rock or a bush'). Do we necessarily have the most basic concept, that of <object> or <event> when we are aware of something? If so, Dretske thinks it cannot be

¹⁵ I make this argument for nonconceptual perception in music in detail in Chapter 6.

much of a concept, and that it is anyway implausible to suppose that infants and animals must have concepts of this kind.

If the concept one must have to be aware of something is a concept that applies to *everything* one can be aware of, what is the point of insisting that one must have it to be aware?

(Dretske 1993: 269)

Dretske's question is at the heart of what I want to explore in this chapter. The possibility of thing-awareness of immanent auditory events—at time-scales short enough for them to constitute a series of perceptual moments within the space of the specious present—suggests that our perception of those events could remain undetermined for some part of the specious present. If the auditory events of music (the tones of a melody, iterations of a sound object) produce some synthetic or analytic apprehension when heard as a series (as Husserl and Schaeffer argue) then perhaps that apprehension depends on mutual determination between the elements of the series. Individual perceptual events both contribute to the way that other perceptual events in the series are seen or heard, and are seen or heard as being a particular way due to the context of the series. The idea of mutual influence between immanent perceptual events undermines the notion of the 'objectivity' of the essence of the sound object which Schaeffer insists on.

The rest of this chapter turns from phenomenology and analytic philosophy to the psychology of vision and audition, focusing on the complementary phenomena of individuation and continuing identity. For an object or event of perception to have a continuing identity it must be demarcated as an object or event which is separate from the rest of the perceptual field—this is individuation. The conditions under which the identity of the object or event remains ongoing is another area of investigation. I will review first Pylyshyn's (2007) work on automatic selection and tracking in vision.

8.4 Individuation and continuing identity in visual perception

8.4.1 Perceptual selection

In order to investigate the notion of thing-awareness of immanent perceptual events, we need to look at what is required to underpin it. How do we fix the reference of our perceptions? How is it that we parse our sensory input—spatially (in vision) or temporally (in audition)—to select an object or event as the object of thing-awareness? What are the attributes of perceptual selection: does it involve a concept, even a lowest-level concept like the one suggested by Dretske, which applies to everything one can be aware of?

Fixing the reference of perceptions is precisely the topic which Zenon Pylyshyn addresses in *Things and Places: How the Mind Connects with the World* (2007). Pylyshyn identifies three reasons why perceptual selection is necessary. First, there is a limited capacity for information

and therefore the perceptual system must, somehow, select some things for processing and filter out others. Second, it is necessary to single out enduring individuals in a way that allows us to keep track of their ongoing identity and refer to them as needed. Third, selection underpins the binding of different properties to a single object of perception.

Essential to the notion of reference is the enduring identity of a thing, its numerical identity through time. According to Pylyshyn's findings, after any absence which is more than fleeting, to re-identify the object of perception requires reference to its properties. Enduring identity (without identification) is therefore something confined to the present in some way and is independent of the properties of the individual object.

In order for something to have an enduring identity it must be, in the first place, individuated—that is, formed into a separate, distinct entity. In vision, this involves the object of perception being 'perceptually separated from the rest by a process that is related to the Gestalt notion of *figure-ground* separation' (Pylyshyn 2007: 31).

Individuation allows tracking; tracking was identified by Gareth Evans as the basis of demonstrative reference:

The fundamental basis ... of a demonstrative Idea of a perceptible thing is a capacity to attend selectively to a single thing *over a period of time*: that is, a capacity to *keep track* of a single thing over a period of time.

(Evans 1982: 175, quoted in Pylyshyn 2007)

To this, Pylyshyn (2007: 34) adds that the capacity to keep track applies to more than one thing at a time and that it does not rely on the representation of any properties of the tracked things, including their locations.

These assertions are based on a varied series of experiments on the theme of Multiple Object Tracking (MOT). A typical MOT experiment involves a number of moving objects on a computer screen, which might be disks or squares but which are not uniquely identified by any property. Some of the objects are designated as targets. The targets blink on and off, after which all objects move unpredictably around the screen. Targets and nontargets (or distractors) move in front of each other, at a speed which would take them about four to six seconds to cross the screen (except that they follow a random-walk algorithm). At the end of a period (perhaps ten seconds), the movement stops and participants are asked to indicate which of the objects were earlier designated as targets (by selecting them with a mouse, or judging whether a flashed object was a target). Pylyshyn and his colleagues found that participants could easily track four targets at one time, even when up to four distractors were present (2007: 35).

One of the findings of Pylyshyn and his colleagues which is perhaps surprising is that differentiating object properties did not heighten the capacity. When every object was different in colour, or size, or shape, tracking did not improve; nor did random changes in shapes and colours make it worse, and in fact participants were in these cases unaware of property

changes. The objects are not tracked by reference to their location (Pylyshyn 2007: 37), and predictability of motion does not improve tracking (2007: 84).

Pylyshyn's conclusion is that we appear to have the capacity for demonstrative visual reference—the capacity to attend selectively and keep track over time—to about four objects, and that the mechanism of reference is not based in recognition either of properties or of the spatial location of the things tracked.

8.4.2 Selection is automatic and computational

If properties, location and direction are not used to differentiate tracked things, what determines how they are first selected? If individuating an object of perception is 'the most primitive preconceptual contact that the mind has with things in the world' (Pylyshyn 2007: 42)—the basis on which limited attention can be allocated to a few objects which occupy the role of figure against a more or less undifferentiated background and to which properties can be bound—then the visual system (Pylyshyn argues) cannot decide what to individuate. The issue is one of recursion: if individuation is the basis for the allocation of attention, then individuation cannot be carried out by allocating attention. Rather, automatic individuation is the prerequisite for all other perceptual differentiation.

An early vision module which is inaccessible to central monitoring selects sensory objects for tracking according to a data driven process which depends mainly on the objects' properties. Although properties are not represented as part of the tracking process, there are some properties which make it more likely that a thing will be automatically selected for tracking. These properties (which are still a matter for empirical investigation, according to Pylyshyn) can work in a causal manner without themselves being represented in consciousness.

[Selection] refers to something that has properties with the causal power to capture it, even though it need not refer to those particular properties (e.g. it might refer to the object that has a unique brightness without referring to its luminance at all).

(Pylyshyn 2007: 96)

Pylyshyn and colleagues found that it is possible to select voluntarily from a range of targets (eg. on the basis of their orientation, or their labelling by a particular letter) but that that process is slower than automatic selection, suggesting that each target must be visited in turn by focal attention. The slower selection when focal attention is involved contrasts with faster automatic selection according to unrepresented properties (Pylyshyn 2007: 63).

8.4.3 Objecthood is not conceptual

Perceptual objects selected for tracking are not selected under any concept, nor with conscious awareness of the properties which determine selection: selection is therefore logically antecedent to predicates (Pylyshyn 2007: 52). That is to say, first, that perceptual objects are selected with thing-awareness, not that-awareness—perceptual selection escapes Sellars's

dictum quoted in Chapter 1 that 'to have the ability to notice a sort of thing is already to have the concept of that sort of thing' (1997: 176). Perceptual selection is unlike intentionality, which is 'not only being conscious *of* something but being conscious of something *as* something' (Gallagher 1998: 106). Second, there is no that-awareness of the properties which determine selection—selection is prior to the ability to describe the object selected. What selection contributes to perception is what indexicals contribute to language: reference.

Peter Strawson¹⁶ argued that identifying or reidentifying something as the same individual thing requires the ability to classify it under the same sortal concept, even the most basic one of <object>, identified by Xu¹⁷ as the first that babies attain. Pylyshyn (2007: 32) argues that selection and tracking do the work of individuation and reidentification without the need for sortal concepts, or the other kinds of conceptual apparatus identified as necessary by Strawson: counting, divided reference (distinguishing *this* from *that*), and tenses (*this_{now}* identified with *this_{before}*). He argues, on the basis of the empirical work described above, that recognizing the numerical identity of a thing and keeping track of its identity as the same enduring thing through changes in its properties and location is something the perceptual system is able to do automatically in many circumstances without paying attention to the thing's properties (Pylyshyn 2007: 33)—in other words, individuation does not require identification (ibid: 52).

Importantly, individuation is also able to do without the concept <spatial location>. An object is at a location when selected and may even be selected because of its location (since one clue that there are several individual objects is that they are at different locations); but to mistake properties of the referent of a representation (the object selected) for properties of the representation itself is to commit what Pylyshyn calls a 'use-mention' error. Thus, authors who rely on location¹⁸ to ground reference are mistaken, as are writers who implicitly rely on location to bind properties of an object¹⁹ (Pylyshyn 2007: 81).

If infants did have the concept <object>, how could it be grounded, that is, how connected with tokens or occurrences of <object>? If the properties which individuate <object> to infants are 'bounded, coherent, three-dimensional, and moves as a whole,' presumably infants also have the concepts <bounded>, <coherent>, <three-dimensional>, <moves as a whole>, in which case <object> could not be their first concept (Pylyshyn 2007: 81), and we would be on the slippery slope to infinite regression.

¹⁶ P.F. Strawson, *Individuals: An Essay in Descriptive Metaphysics* 1959

¹⁷ F. Xu (1997) From Lot's wife to a pillar of salt: Evidence that *physical object* is a sortal concept. *Mind and language*, 12, 365-392

¹⁸ Pylyshyn cites A. Clark *A Theory of Sentience* 2000

¹⁹ Pylyshyn cites W.V.O. Quine *Pursuit of Truth* 1992

Another way to say why a mechanism such as [selection] is important is that even if the early vision system somehow *had* the full conceptual apparatus of individuation and identity it still could not use that apparatus to connect to the world unless at some stage along the processing chain there is a causal leap from things in the world to concepts.

(Pylyshyn 2007: 57)

The problem of grounding concepts is a familiar argument for nonconceptual content. Here Pylyshyn is arguing that the concepts of objects are grounded in the output of an automatic encapsulated process, the internal functioning of which is inaccessible to central monitoring. Perceptual selection individuates an object of perception (which may or may not be a discrete physical object) which then serves as a vehicle for a concept of what is perceived. Pylyshyn argues that such 'proto-concepts' underpin the development of conceptual capacities in general. For instance, infants are innately capable of distinguishing between possible causal events (an object moving another object by hitting it) and closely similar events which have incompatible spacing or timing—this is not the concept <cause>, but a computationally-provided perceptual category (Pylyshyn 2007: 98). Pylyshyn proposes that infants have an innate sensitivity to some properties, computational or rule-based equivalents to things like <cause> and <object> which are largely co-extensive with their conceptual equivalents, but not identical (2007: 51-52). The innate structure of the perceptual system (presumably due to evolution) is 'constrained so that our representations tend to be veridical most of the time, not in general, but in the kind of world in which we happen to live (our ecological niche)' (Pylyshyn 2007: 98). Pylyshyn calls these kinds of computational perceptual categorizations 'proto-concepts'.

Proto-concepts are the basis on which beliefs can be built in central processing. In coming to participate in a network of meanings, the proto-concept is replaced by a concept. This clarifies Dretske's question above, If the basic concept of <object> applies to everything, what is the point of insisting that we must have it to be aware of an object? The shift from proto-concept to concept is associated with the development of beliefs and the participation of the concept in a network of meanings.

The existence of the proto-concept in vision appears to be the natural-world counterpart for the continuity of identity which Husserl found through the series of adumbrations of a transcendent object. In the context of this thesis, the fact that the proto-concept of the object in vision exists without consciousness of the properties of the immanent percept is important in establishing the possibility that the properties of immanent percepts may be undetermined pending the apprehension of the series of perceptual events as a whole within the specious present.

8.5 Individuation and continuing identity in auditory perception

8.5.1 Auditory stream segregation and segmentation

The computational processes of selection and individuation described by Pylyshyn for vision have much in common with the processes of auditory scene analysis explored by Albert Bregman (1990). Again, an interesting problem arises due to the temporally-structured nature of sound. Bregman is in the main concerned with auditory streaming, that is, the segregation of overlapping streams of sound with the evolutionary purpose of attributing them to separate sources. However, he also identifies computational rules (not accessible to central monitoring by the subject) for auditory stream segmentation into discrete events. It appears that we can have a proto-concept of a discrete, temporally-bounded 'event', in the same way that we can have a proto-concept of 'object'.

How does our perceptual system choose what to perceive as an auditory event, the counterpart to a visual object? There are two kinds of objects of perception in sound which can be distinguished, sonic events and auditory streams. To segregate a stream in audition is to pick out some sounds as forming a single continuum which is individuated from the rest of the sonic texture. To segment a continuing texture is to hear temporally discrete happenings, each with a beginning and an end. I will address these two capacities in turn.

As Bregman (1990) notes, the pattern of acoustic energy which impinges on our ears is a mixture of sounds from different sources. The various frequency components of two co-occurring sound sources may be interlaced and overlapped, with components of each sound at higher and lower frequencies than some components of the other sound. In principle, the separation of sounds from different events might be achieved by binding components to an identified source, their cause. Bregman's investigations into auditory scene analysis, however, show that, as with vision, there are encapsulated processes which apply to proximal sensory data and which are inaccessible to central monitoring. These encapsulated processes individuate a cluster of sonic components as a single stream. As with vision, the auditory streams so individuated serve to distinguish coherent events, without the need for the concept <event>. In mundane terms (rather than in music), auditory streaming corresponds to visual object tracking and the computational mechanisms which serve to individuate auditory streams in perception work tolerably well to distinguish different sources of sound in the real world.

Bregman's meta-analysis of a wide range of empirical studies of different aspects of auditory scene analysis identifies a number of interacting aspects of sound which contribute to our ability to hear separate sources. In the latter case the sound often gives us information about the different entities involved in the real-world event. Music, as Bregman writes, often tries 'to fool the auditory system into hearing fictional streams' (1990: 457)—for instance, to hear an ensemble as one stream, or to hear the different notes in a single line played by a single instrument (such as a cello suite by J.S. Bach) as belonging to two or more streams—so-called 'virtual polyphony'. In other words, because meaning in music is immanent, concerned

with the proximal percept rather than its distal cause, the composer is free to play with the automatic responses of our perceptual system.

Bregman argues for a view of auditory scene analysis which utilises both innate and learned constraints, yielding respectively 'primitive' and 'schema-based' segregation and integration of sounds (1990: 38). Although there will be some learned schema-based contributions to our perception of streaming in music (eg. the learned coherencies of harmony), Bregman argues that schema-based (learned) segregation and segmentation is bootstrapped by primitive (innate) segregation and segmentation processes, and is effective in more specific environments (1990: 458). For instance, segmentation of speech into words might depend partly on recognition of individual words (Bregman 1990: 40). The brief overview below of auditory perceptual selection focuses on primitive segregation processes.

8.5.2 Mechanisms of auditory streaming

Perceived spatial location of sound source might seem, at first, a likely candidate for streaming. However, spatial location by audition is weak, and dependent on other cues, such as visual information (Bregman 1990: 659). Bregman (1990: 83) suggests that apparent spatial location may not have evolved to be a strong cue for streaming because auditory location cues can be confusing: sounds might come from two different sources, both in the same direction from the listener, and may travel by deviant paths to the ear, involving reverberation and echo and passing around obstructions.

It is not necessary for my purposes to describe in detail the rules by which streaming and segmentation occur. The mechanisms described in Bregman's book are complex and interacting. They relate for instance to pitch (as given by the system of harmonic overtones); formant frequency (an emphasis in overtone amplitude which is independent of the pitch of a sound); relative time of onset of the sound; the Gestalt principle of 'common fate' (where parts of the perceptual field are changing in the same way at the same time; eg. with regard to relative frequency or amplitude); timbre; the speed at which individual events succeed one another; and the relative loudness of successive events. These cues sometimes conflict, resulting in ambiguous or optional segregation or segmentation effects.

Of interest are the streaming effects of pure-tone glides, ie. sine tones which change frequency at a constant rate. Two glides at the same slope will tend to group if their start and end points are set so that they have the same midpoint (Bregman 1990: 110). This phenomenon illustrates with particular clarity how perceptions of individual auditory events in a sequence are co-determined by the properties of the auditory event and the properties of other auditory events in the context of the specious present. The grouping of pure-tone glides appears to be an example of congeneric iconic signification, in this case carried out by an encapsulated process.

8.5.3 Auditory streaming as nonconceptual selection and tracking

Bregman argues that individuation of auditory streams is the result of initial auditory scene analysis carried out on low-level properties automatically by the auditory system (ie. at a level inaccessible to central monitoring), providing a computational individuation of an event or source to which properties can be attached. Thus, although every sound must have a physical source or origin, 'this does not guarantee that the origin is represented in the perceptual domain or that all the information that has been received from that origin will contribute to the appropriate mental description' (Bregman 1990: 531)

Auditory stream segregation is related by some theorists to attention, with stream segregation viewed as a failure of attention to shift focus quickly enough to follow all the tones in a sequence. However, Bregman suggests that stream segregation is largely the result of grouping performed by a pre-attentive mechanism. This view is supported by an experiment which showed that a sequence of tones to which a listener is not paying attention can 'capture' tones from the field of attention—evidence that the second stream can exist although attention is not paid to it (Bregman 1990: 206). Other experiments indicate the possibility of simultaneous, separate auditory streams for processing verbal stimuli without focal attention (Bregman 1990: 207-08). Bregman points out that we are capable of segregating any one of six instruments playing in an ensemble (depending on the writing) but cannot pay attention to all these streams at one time. The existence of a stream does not indicate that it is being attended to, but only that it is available to attention, on a continuing basis (Bregman 1990: 465).

Bregman's view on auditory streaming accords with Pylyshyn's view on visual object tracking: the mechanism of capture and tracking is automatic and inaccessible to central monitoring and that although it can interact with voluntary attention, does not require it. If we accept that we can track auditory streams automatically without attention (in the same way that Pylyshyn has shown that visual objects of perception are tracked) and without representation to central monitoring of their properties (although their properties may cause the streaming effect) then an auditory stream need not be conceptualized as an <event>. In both the visual and the auditory case, the output of the computational system is a proto-concept which can be used as a placeholder for properties, allowing the potential construction of a conceptual representation.

8.5.4 Auditory stream segmentation: hearing discrete proto-events

'Auditory stream segmentation' refers to the temporal parsing of the auditory into discrete, temporally-bounded events, rather than ongoing streams. The introduction of discrete auditory events complicates the picture somewhat. Can we have a proto-concept of a discrete event, in the way that we can have a proto-concept of a visual object or of an auditory stream? The rules of auditory grouping indicate that this is possible: some sequences of sounds resolve into discrete events according to computational rules.

Bregman suggests that 'unit formation' and 'stream formation' are just different aspects of a single process, the unit segregating events in time as the stream segregates them in frequency. A series of dissimilar units probably signals a series of distinct events in the world.

Sequential units are formed by our auditory system for the same reason that parallel streams are: to create auditory entities that can serve as centers for description.

(Bregman 1990: 71-72)

We speak of the 'onset' of a sound, and this appears to be related to sudden rises in intensity. A rapid series of plucked guitar notes, with a sharp attack and a gradual decay so that notes overlap still sounds like a series of discrete events (although, of course, the series can also be parsed into groups of attacks, forming larger-scale events which are heard as wholes). There is more to a guitar attack than the intensity envelope, of course. As with most string instruments, there is an extremely complex spectrum with the attack, which dies away as the tone progresses, and this is another perceptual cue to the start of an auditory event (Bregman 1990: 115).

Units tend to form where a region of sound has uniform properties and fast changes in properties are perceived as boundaries. Where dissimilarities are extreme, units resist synthesis into a larger perceptual unit. For instance, when subjects heard four sounds repeated in a cycle—a hiss, a tone, a buzz, and the speech sound "ee"—with each sound occupying 200 milliseconds, they could quite easily detect each of the individual sounds, but could not report their order in the cycle. Bregman hypothesizes that the inability to report order in the cycle of disparate sounds was due to perceptual groupings of identical sounds in the cycle (the splitting into streams of like events), dominating the synthesis of the cycle as a unit (Bregman 1990: 143-44).

8.6 Summary

This chapter has introduced the notion of the specious present, with its structure of retentions and protentions. The specious present provides a temporal extent over which apprehensions unifying a series of perceptual events operate. Three important properties of the specious present are the experience of movement or succession, the ability to consider a sequence of perceptual events as a whole, and the continuity of identity of an object of perception. The last of these is key to my argument, since it provides the possibility of an open intentionality, a coherence between successive perceptual moments which is not dependent on perceived properties, thus leaving the way open for a synthesis of percepts into a novel apprehension.

I discussed Fred Dretske's (1993) opposition of 'thing-awareness' to 'fact-awareness', arguing that thing awareness of objects and events can occur without any conceptualisation of the object or event. Zenon Pylyshyn's argument that encapsulated perceptual processes in vision provide 'proto-concepts' of objects and events to consciousness is hypothesised to underpin the continuing identity without identification of thing-awareness.

The notion of proto-concepts was transferred to auditory perception, based on the work on auditory stream segregation and segmentation of Albert Bregman (1990). Auditory stream segregation identifies an ongoing stream as proto-event, while auditory stream segmentation provides temporally discrete proto-events to perception.

9 Nonconceptual perception in music

9.1 Introduction

I have argued in Chapter 3 that the essences revealed by Husserl's method of eidetic variation are sedimented perceptions, and in Chapter 4 that those sedimented perceptions are observational concepts. In this chapter I propose that novel perceptions can arise through a process of abstraction occurring within the specious present and based on an active, nonconceptual apprehension of relations between the concrete contents of perceptual events.

I begin with Fred Dretske's (1981) distinction between 'analog' and 'digital' representation. Digitization of information involves a reduction of information. I proceed to critique the analog-digital distinction on the grounds that Dretske's examples deal with variation in only one dimension. Digitization in these cases can be achieved just with generalization.

I define generalization as the ignoring of differences, in opposition to abstraction which is the finding of similarities. Both are necessary to perception—seeing two objects as being two instances of the same thing involves finding the similarity between them and overlooking the differences between them. A model for abstraction can be found in Haugeland's (1991) definition of 'iconic' representations, which depend on concrete relations between the elements of the representation. Iconic representation in Haugeland contrasts with logical representation, in which concrete relations between the elements of the representation are not significant for the content it carries.

Iconic representation in perception would be intermediate between nonrepresentational sensation and knowledge and beliefs. Various authors (Bermúdez and Macpherson 1998; Pacherie 2000) have argued for the existence of such intermediate representations in the form of the outputs of modular processes. In particular, Pacherie (2000) refers to the existence of visual representations of spatial properties and relations which are available for voluntary physical and mental actions such as planning and executing movements and object recognition and classification.

The middle section of the chapter deals with Christopher Peacocke's (1986) notion of analogue content. Since Peacocke's analogue content deals with relations between magnitudes, I coin the term 'relational perception' to make clear the difference from Dretske's analog representation. Relational perception is presented as the mechanism of conscious nonconceptual content. Relational perception is indexical, being tied to the perceiver's momentary situation in time and space, relative to the objects perceived. Relational perception

underpins demonstrative perceptual concepts, which are available only while the observer is undergoing the relevant perceptual experiences.

The final section of the chapter puts the argument for nonconceptual content in music. I first differentiate relational perception from the output of modular processes of audition, such as beat entrainment and auditory scene segregation. I then present, in brief, Mark DeBellis's (1995) argument for nonconceptual hearing in music. Untrained listeners can have the concept of a particular melody (such as 'Happy Birthday') without possessing concepts of pitch relationships. Since the concept of the melody depends on pitch relationships, those relationships must be represented nonconceptually for the untrained listener.

Referring to the idea of polysemy in music, and picking up again Dretske's (1981) and Haugeland's (1991) taxonomies of representational types, I argue that relational perception—unlike Dretske's digitizations or Haugeland's logical representations—carries as content a rich set of relations between its components which approaches the real world in its complexity.

Finally, I argue that the dynamic and labile nature of the abstractions available in music is responsible for the particular experience of processuality it gives. An observational concept is a publicly-shared abstraction which is stable and to which individual immanent percepts are assimilated. The abstractions of music, on the other hand, may be novel apprehensions which can be further modified by the ongoing arrival of new auditory events.

9.2 Information and representation

9.2.1 The problem of classification

If I have an observational concept of a square (or of a particular sound object) and I catch a glimpse of a shape or I hear a noise over the space of a split second, how do I come to assimilate those immanent percepts to the appropriate observational concept? What is of interest is not how we associate immanent percepts with objects and events in the world, but how we manage to classify them in the first place. There are a potentially infinite number of immanent percepts which must be assimilated to a single classification, for identification of real world objects and events to occur. Jorge Luis Borges's story *Funes the Memorious* illustrates the difficulty:

We, in a glance, perceive three wine glasses on the table; Funes saw all the shoots, clusters, and grapes of the vine. He remembered the shapes of the clouds in the south at dawn on the 30th of April of 1882, and he could compare them in his recollection with the marbled grain in the design of a leather-bound book which he had seen only once, and with the lines in the spray which an oar raised in the Rio Negro on the eve of the battle of the Quebracho.

[...]

He was, let us not forget, almost incapable of general, platonic ideas. It was not only difficult for him to understand that the generic term *dog* embraced so many unlike specimens of differing sizes and different forms; he was disturbed by the fact that a dog at three-fourteen (seen in profile) should have the same name as the dog at three-fifteen (seen from the front).

(Borges 1968: 40)

Funes appears to be forced to construct a concept *sui generis* for each state of the world he perceives. However, this is not the normal human experience—for most people, immanent percepts are assimilated to an apprehension. The underlying problem can be illustrated with this example: If we have proximal images which are circular and proximal images which are square, how is it that we can sort the squares to exclude the circles, or the circles to exclude the squares? Conversely, imagine a white plate on a dark background, viewed straight-on so that what is presented is a perfect circle. How, when presented with the identical view again, do we manage to classify the two shapes as the same? Even if we assume that we possess a photographic memory such as Funes's, what, in this simplified example, is the same? Put in this way, the issue is one of data reduction: how can multiple inputs (such as two shapes which happen to be circles) be categorized so as to produce one output (an identification as <circle> or <square> or simply as <that shape>)?

9.2.2 Analog and digital signals

It is convenient to approach the problem of classification first through Dretske's (1993) distinction between thing-awareness and fact-awareness—that is, between having something in one's perceptual field and having a conceptual apprehension of it.

In his *Knowledge and the Flow of Information* (1981), Fred Dretske famously extended the traditional sense of the analog-digital distinction—that between a continuous and a discrete representation of some variable—to apply to representations of facts. Thus, a thermometer provides an analog representation of variable temperature, while a thermostat digitizes temperature information in order to turn a heater on when the temperature falls to a particular value.

Digitization constitutes a reduction of information (Dretske 1981: 140-41). A thermostat, for instance, assimilates all the different temperatures above a given temperature to the one output “off”, and all those below a given temperature to the one output “on”. A signal which carries the

information that 's is F' in analog form carries more specific and determinate information about s than that it is F. This is easy enough to see for the example of the thermometer versus the thermostat. If the thermometer (the analog representation) carries the information that the temperature is above 30°C, it also carries the information of its precise temperature. The thermostat's digital representation, on the other hand, carries only the information that the temperature is above 30°C (plus any information, of course, which can be inferred from this fact). In Dretske's words, 'The more specific pieces of information it carries are systematically ignored in order to achieve a uniform response to *relevant similarities*' (Dretske 1981: 141, italics in original).

Dretske characterises apprehensions as digitizations of input to the perceptual systems. On this view,

Seeing, hearing, and smelling are different ways we have of getting information about s to a digital-conversion unit whose function it is to extract pertinent information from the sensory representation for purposes of modifying output.

(Dretske 1981: 142)

We can think of the immanent percepts which impinge on the peripheral sensory organs as the source of information, and the sameness which belongs to different percepts as the content of a representation which constitutes a reduction of data from the information available at the source. The representation can be thought of as the content of a signal which carries part of the information from the source, arriving at a higher module of the mind. Thus, information about the properties we generalize over (ie. ignore) are lost in the signal to the higher module where the representation is formed (although they may be retained in signals to other modules of the mind).

What is retained in the representation, and is still unexplained, is that-awareness of sameness, of something in common between two or more immanent percepts (whether they are two percepts of a square or two percepts of a Schaefferian sound object). Without digitization someone can only be (in Dretske's 1993 terminology) thing-aware; fact-awareness requires digitization. This is unproblematic in the case of observational concepts. However, a closer investigation into the process of information reduction to produce observational concepts provides an argument for nonconceptual apprehensions.

9.2.3 Generalization versus abstraction

The analog-digital distinction is important and useful, but the examples given blur an essential distinction between the processes of abstraction and generalization.

If the adaptive purpose of perceptual categorization is to guide action (motor action or mental action), then the way we categorize percepts will depend on what we are trying to do with them. Imagine we have before us a number of rocks, some spherical and some with a straight-sided profile and all in different sizes. If we are looking for objects to serve as stepping stones

across a creek, shape will be a consideration, with flat sides providing more stability. On the other hand, if we want an object we can throw at a rabbit, we will categorize according to size. So we could either overlook size in order to categorize by shape, or we overlook shape in order to categorize by size. There are two kinds of assimilation at work here. One is overlooking differences (overlooking size or overlooking shape) to group percepts together—this is generalization. The other kind of assimilation is according to the unifying factor between percepts which differentiate them as a group from other percepts (eg. all flat-sided objects, or all objects of a size convenient for throwing)²⁰—this is abstraction.

The concept of a shape, such as a rectangle, is an abstraction which is independent of the determinate properties of any instantiation of it. Different rectangles, for instance, can be differently proportioned. Even the concept of a square (by which the relative proportions of the lengths of sides is specified) is independent of an instantiation at any particular size (and of other properties, such as the colour). I noted in Chapter 4 that Bishop Berkeley argued that properties shown to be true of any particular cannot be generalized to another triangle which is different unless it can be demonstrated to be true for the abstract idea of a triangle (1710: 34-35). In fact, Berkeley actually denied the possibility of abstract ideas—because he thought of ideas as images (ibid: 35). Of course, as Robert Cummins argues,

images can simply be, as it were, silent about certain matters. For example, it is possible to imagine your car without thereby imagining the license plate down to the number and the name of the state. Your image, then, will equally "agree to" any car that differs from yours only in license plate.

(Cummins 1989: 33)

This was also Berkeley's understanding of how it is possible to think in the abstract of particular objects—by simply deleting from your image of them those aspects which distinguished them from others of their class. However, this is not abstraction, but generalisation.

Since it is rare for two proximal percepts to be exactly the same, generalization is a necessary part of perceptual categorization. Even if (like Funes), alongside the process of categorization we remain aware of all the detail of our perception, the assimilation of two percepts to one idea requires a reduction of data. This can be seen in the operation of congeneric iconic signs, where the abstract signified is the property (the 'qualisign', in Peirce's (1955) terminology) for which the concrete signifiers are a vehicle. The concrete iconic signifiers instantiate the abstract signified with an excess of materiality, different for each signifier, which the signified does not exhaust. The excess materiality, and the differences in it between signifiers, are necessary in order that the similarity between them (which is the signified) can be abstracted by the reader of the sign. The same argument applies to both eidetic variation and observational concepts, which, I have argued in Chapter 4, are special cases of congeneric iconic signification. In eidetic variation the essence is a reduction of information which excludes the inessential

²⁰ Dretske (1981: 182) defines generalization and abstraction in much the same way.

properties of the immanent percepts (which are those that are different in successive imaginative variants). In visual observational concepts of shapes, the concept is exclusive of the additional information available regarding the angle of perception.

If we could only generalize without the ability to abstract, everything would be indistinguishable in terms of its properties. Allowing the existence of modular processes which individuate objects of visual perception (or segregate streams in auditory perception), we would be capable of the most basic concepts such as <object> and <event> but we would have no way of grouping some instances of these together in opposition to some others. We could only ever be—in Dretske's (1993) terms—aware-of, never aware-that.

9.2.4 How we abstract

Abstraction is more than generalization, more than the ignoring of differences. For instance, if we ignore the differences of dimensions of various rectangles, how do we differentiate them from squares? Generalisation only ever serves to include more examples: we can ignore the differences of dimensions to include rectangles, ignore differences of angle to include all four-sided figures, ignore the number of sides to include triangles, ignore the straightness of sides to include all closed figures: but ignoring differences does not serve to differentiate each of closed figures, triangles, rectangles, and squares. It is when we have a group of (say) polygons and we can exclude eg. triangles and other figures to identify rectangles that we can be said to abstract.

The question of how we process sensory input to make perceptual abstractions of visual shapes or auditory sound objects is similar to the question of how digitization of analog information occurs. Where there is variation along one dimension (as with Dretske's example of a thermostat), digitization involves generalization over a range of analog values which are assimilated to a single output—for instance, the range of values above the set temperature are assimilated to a single output which signals the heater to turn off. In this case, abstraction—assimilating a group of inputs to each other according to the unifying factors which serve to differentiate the group from inputs not belonging to it—is just the same as generalization. The unifying factor is that the inputs in one group fall on the same side of a dividing point in the range of values (the temperature at which the switch turns on or off). However, in unidimensional examples such as the thermostat—or Dretske's (1981: 136) example of an oil pressure light which comes on when pressure falls below a certain point—the dimension of change is assumed as a given. Thermostats and oil pressure warning systems are constructed so as to respond to change only in the relevant dimension and as examples of digitization perform a much simpler task than the processes of abstraction which are available to human perception. The abstraction from the available analog information which instruments such as thermostats perform is built into the design of the instrument and is the only abstraction with which it operates. What I want to investigate is the human capacity for creating novel abstractions.

9.2.5 Haugeland's representational genera

If digitization is the assimilation to a single output of a range of values in a predefined dimension or dimensions of an analog representation, perhaps the key to abstraction is in defining the dimensions along which variation is significant.

Haugeland's (1991) elucidation of representational genera distinguishes between logical representations (such as natural languages and computer languages), iconic representations (such as pictures, diagrams, and scale models), and distributed representations (instantiated by some connectionist networks). The distinction which is of interest for my purpose is the one between logical and iconic representations. Having shown (Haugeland 1991: 64-73) that the kind of relations between the representations and what they represent are more indicative of mechanisms of recording than of representational genera, Haugeland goes on to define representational genera themselves in terms of the kinds of content they carry. This requires the recognition that representational genera piggy-back on one another, that they are sometimes parasitic or symbiotic (the legend of a map, and prosody in speech are two examples), and that they produce 'separate but related content on two distinct levels' (Haugeland 1991: 75). Haugeland is thus concerned to approach the 'bare-bones content', separated from any piggy-backed content and the implications which could be drawn from it by a subject with appropriate background knowledge.

The primitive elements of logical representations are always identifiable separately and individually—which is to say that the concrete relations between them, if any, do not contribute to the representational content in any way. In Haugeland's example, it can be a matter of fact that a glass is broken, whether or not 'it is larger than the cockroach, contains traces of whisky, or used to belong to the deceased' (1991: 78).

On the other hand, the bare bones of a photograph (taken as an example of an iconic representation) are only 'relative variations in brightness and color, with respect to direction' (Haugeland 1991: 77). According to Haugeland, iconic contents can be thought of as 'variations of values along certain dimensions with respect to locations in certain other dimensions' (Haugeland 1991: 79). Two examples are variations of temperature with respect to time (as in a thermometer), or altitude with respect to latitude and longitude. Dependent and independent dimensions can be identified in iconic representations: for each point in the independent dimension, a point is determined in the dependent space, but not necessarily *vice versa*. Thus, for each point in the relevant region of time, a temperature is determined, but there is not necessarily a point in time at which any particular temperature occurs: the temperature might, or might not, reach 40°, for instance. Further, the representational token of any iconic scheme presupposes a regular structure for both dependent and independent dimensions. What is graphed is the shape of the variation. In the temperature graph, all temperatures and instants of time are relevant only as placed along their respective dimensions relative to all the others. On a map, each point must be located within a structured two-dimensional space, in order for the map to be useful.

Haugeland's logical representations equate with what Dretske calls 'semantic content', for example knowledge and beliefs which have digital contents which are independent of any information nested in them. Dretske's (1981: 137) definition of the generalised analog-digital distinction can be paraphrased as follows:

A signal carries the information that *s* is *F* in *digital* form if and only if the signal carries no additional information about *s* that is not already nested in *s*'s being *F*. Additional information in the signal about *s* which is not nested in *s*'s being *F* is carried in analog form.

The defining feature of analog signals for Dretske, then, is not the concrete relations which hold between the elements they comprise (as for Haugeland's iconic representations). It is that the information they carry is not restricted to a single item. Analog signals carry 'additional information' which a digital signal does not. A statement to the effect that 'The cup has coffee in it,' supplies in digital form the information that the cup contains coffee—that is, as a simple fact, with no specific information such as how much coffee, how big the cup is, how dark the coffee is, and so on.

If, on the other hand, I photograph the scene and show you the picture, the information that the cup has coffee in it is conveyed in analog form. The picture tells you that there is some coffee in the cup by telling you, roughly, how much coffee is in the cup, the shape, the size, and the color of the cup, and so on.

(Dretske 1981: 137)

Analog perception is richer than semantic content.

Iconic representation may provide a model for nonconceptual perception. If a mechanism of iconic representation exists in human perception at the level of apprehensions, its outputs would occupy a position between sensation (pure information) and the single piece of information which is the output of a digitization process. Iconic representation in perception would occupy a level between 'thing-awareness' and 'that-awareness' of an object of perception. The next section argues for the existence of representation at an intermediate level between sensory input and conceptualization.

9.2.6 Intermediate representations

Elisabeth Pacherie (2000: 247) argues that perceptual grouping phenomena (including visual grouping and auditory streaming) involve a predigitization of part of the information provided by sensory representations, in that certain spatial properties and relations of the perceived layout are made salient while more specific pieces of information about the layout are ignored. These

kinds of perception, Pacherie calls 'intermediate perceptual representations'—intermediate, because they are situated between sensation or 'simple seeing'²¹ and belief.

Of the several examples Pacherie uses to argue that perceptual grouping is neither belief nor simple perception, I will refer only to the one relating to the Müller-Lyer illusion (see the illustration of the Müller-Lyer diagram in Chapter 4). As is well known (and can be verified by measurement) the lengths of the two lines in the Müller-Lyer diagram are the same—this constitutes a belief on the part of the aware perceiver. But the perception of the two lines as unequal (which is how most people in Western cultures cannot help seeing them) is resilient to the cognitive belief that they are in fact equal in length—measuring the lines and finding them equal does not change the perception of them as unequal (Pacherie 2000: 241). On the other hand, Dretske's 'simple seeing'—equivalent to sensation, or analog perception, in his 1981 terminology—cannot account for the experience since the lines cannot carry the information that they are of unequal length because they are not (ibid: 240-42). The argument can be generalised to the outputs of other subpersonal modular processes, since modular processes in general change sensory input so that it appears to be a certain way and they can be perceived that way without holding the corresponding belief.

We thus have a form of perception which is neither sensation nor conceptual. At this point, it is pertinent to provide a definition of nonconceptual content. Here is Michael Tye's definition:

The claim that the contents relevant to phenomenal character must be *nonconceptual* is to be understood as saying that the general features entering into these contents need not be ones for which their subjects possess matching concepts.

(Tye 1995: 139)

Other authors have argued in similar fashion to Pacherie for nonconceptual perceptual content. In particular, José Bermúdez (1995) has argued for the output of modular processes as nonconceptual content.

However, Pacherie's article continues with another kind of computational vision. She references Shimon Ullman's²² discussion of visual routines which are applied to a set of early visual representations to yield a representation of spatial properties and relations. The routines include the capacity to control processing focus—in line with Pylyshyn's (2007) findings on focal attention, discussed in Chapter 5, processing focus may be either task-independent and stimulus driven or voluntarily directed (Pacherie 2000: 252 n.9). The information at the

²¹ Dretske's term, from *Seeing and Knowing* (1969). As Pacherie explains it, 'simple perception' (non-epistemic seeing) is distinguished from 'cognitive perception' (epistemic seeing). Simple or non-epistemic seeing 'does not involve, in any essential respect, a particular belief or set of beliefs on the part of the perceiver' (Pacherie 2000: 238)

²² Shimon Ullman *High-level Vision*, MIT Press 1996

locations distinguished by processing focus is further processed in terms of spatial properties and relations and Pacherie argues that the representations so produced are not cognitive (do not involve beliefs) since the processes from which they result can operate in a bottom-up fashion (Pacherie 2000: 247).

9.3 Relational perception

9.3.1 Peacocke's analogue perception

The status of such relational perception has been explored by Christopher Peacocke ('The Inaugural Address: Analogue Content' 1986). Peacocke's notion of 'analogue' content is like Haugeland's characterisation of iconic representation rather than like Dretske's description of either analog²³ or digital signals, in that it describes a kind of representation—not 'simple perception' or sensation—in which the concrete relations between different dimensions carry the content of the representation.

This quote from Peacocke identifies the difference between analogue representational content and observational concepts:

When we say that an object looks octagonal to a perceiving subject, we are saying something which covers each of two rather different sorts of case. One is that in which the perceiver has the concept 'octagonal', necessarily exercisable whether or not something is presented as octagonal to him, and has a perceptual experience as of something falling under that concept. That experience also has, of course, a more fine-grained analogue content given by the particular manners in which the shapes in his environment are perceived. The other type of case is that in which the subject does not himself have the concept 'octagonal' in his repertoire, but in which in a clear sense, he still sees the object as having the same shape as does our first perceiver. Our second perceiver sees the object as having the shape, perceived in a manner given by an analogue shape content, which octagonal things present when placed in a certain relation to him.

(Peacocke 1986: 15-16)

We can find the dimensions of objects and other magnitudes by measurement, in which case the magnitudes will be specified in terms of units (such as feet, degrees, pitch class or frequency). On the other hand, we can look at objects such as furniture and rooms, and wonder whether, for instance, a piano will fit between the door and the bookshelf, and this is what Peacocke (1986) calls analogue content. The important point about the two kinds of perception is that they are distinct: one kind of perception of magnitudes cannot be directly converted into the other. If we perceive a length, such as the distance between the door and

²³ The meaning of Dretske's 'analog' is similar in some respects to the meaning of Peacocke's 'analogue', and different in other respects. In order to mark the difference, I have maintained the spelling which each uses when referring to their particular sense of the term.

the bookshelf, we do not necessarily know its length in feet and inches. If the piano is standing nearby, with the relevant lengths (of the wall and the piano) in the same orientation, we can see with some precision which one is shorter. However, if the piano is in the showroom, and we have its dimensions written down, it is not necessarily true that we can as accurately compare the magnitude of the piano as specified as a certain number of units with the perceived magnitude of the wall.

Analogue perception seems to be available generally for perceptible magnitudes. Examples given by Peacocke are distance from egocentric position, direction from egocentric position, length, angle, speed, and musical pitch (1986: 7). Rather than being measured according to discrete units the perceptions are essentially continuously variable—‘essentially’ because Peacocke allows that digitization of the magnitude might occur at a low level, due to the limits of discrimination of the sense modality involved.

The relations between the perceiver’s impressions of perceived objects are isomorphic with the relations between the objects themselves (Peacocke 1986: 8). Analogue content is a matter then, of comparing proximal percepts. It is the perception of relations which I think is key. The perceiver can see if two magnitudes are matching, or one is larger or smaller than the other, however the perception of magnitude is relative, not to some permanent standard (a unit of measurement which exists outside of the immediate situation) but rather to other magnitudes perceivable in the present. To capture this key aspect of analogue perception, I have coined the term ‘relational perception’.

Peacocke extends the notion of analogue content to two- and three-dimensional shapes of surfaces and objects (1986: 15). Although he is not explicit about the how analogue perception of shape might occur, it is easy enough to think of it in terms of relations between isomorphisms of magnitudes internal to the shape, relations between the lengths of sides and the size of angles, for instance.

Within the resolution limits of the respective sense organ, the direct comparison of magnitudes allows for arbitrarily fine discriminations for which the perceiver does not need to possess individual concepts. As Peacocke expresses it, it is likely that humans can be in only finitely many significantly different brain states, but if the environment is infinitely divisible or variegated, the capacity to perceive it in terms of relations between magnitudes will depend on reference to the environment. Of course, any difference between two states of the environment which is reflected in the content of the perceptual representation must entail a difference between brain states. The ‘significant’ difference which Peacocke says must be lacking is surely the ability to make stable and enduring representations of the infinite number of variations we are capable of actually perceiving. To have this ability would be to be like Funes the Memorious, able to construct a concept *sui generis* for each state of the world ever perceived. It is, no doubt, possible to construct concepts which reflect arbitrarily fine discriminations, but without a fluid and dynamic ability to perceive the current relations in finely-variegated states of the environment, it would be necessary to possess an infinite number of concepts in order to

use them to differentiate meaningfully between different states of the world. Thus, 'it follows that facts about matching do not supervene solely on the subject's central states' (Peacocke 1986: 6)—in other words, they are constrained by the environment of which they are a perception.

What is in the mind is the perception of relations between magnitudes, and it is this which it is possible to conceptualize and so make available for retrieval once the magnitudes in the environment are no longer available to perception. The way the relations between magnitudes are conceptualized will depend on the concepts possessed by the perceiver and on their skill in applying them. Thus, 'the same,' 'larger,' and 'smaller' would be some basic-level digitizations of relations. More sophisticated relations might be 'double,' or 'half' (for instance in the case of the rhythmic pattern ratios discussed in Chapter 4); or might involve relations between three things, smallest, largest, and in-between.

9.3.2 Perceptual demonstrative concepts

It follows from the reliance on the environment to carry the information of the representation that the magnitudes themselves, unless they are conceptualized in terms of some permanent standard, will not be available outside the immediate situation—in fact, they will be available only within the specious present. Analogue contents are by their nature situated both temporally and spatially—as José Bermúdez and Fiona Macpherson (1998: [28]) point out, nonconceptual content is always indexical. In addition to carrying information about relations between magnitudes in the world, the relation between the perceiver and nonconceptual content is built into the content—we see objects from a particular angle and distance:

[T]he nonconceptual content of experiences [...] can feed directly into the control of actions—because it provides information about the relationship between the perceiver and the world.

(Bermúdez and Macpherson 1998: [28])

However, there is also a mechanism by which indexical contents can interface with non-indexical contents, and these are perceptual demonstrative concepts, such as 'that shape' or 'that interval of time', or even simply 'that object'. We can recognise here Dretske's (1993: 269) most basic concept, 'a concept which applies to *everything* one can be aware of'. A visual perceptual demonstrative <that object> then, is a concept based on a proto-concept provided to consciousness by the automatic selection processes identified by Pylyshyn (2007). Dretske wondered what the point of having such a low-level concept might be; William Seager points out that perceptual demonstratives are 'the perfect tool' for relating current (nonconceptual) experience to existing conceptual representations:

But best of all we have ready to hand, instantly constructible (and storable in memory or forgettable), a set of indexical concepts which we—as thoroughly conceptual beings—can apply to experience whenever we like, so long as we are having the experience, recreating it in memory or imaginatively generating it: this pain, this colour, this sound, etc. It seems to me that these indexical concepts are the perfect tool with which to bring any non-conceptual contents into contact with the conceptual. [...] Indexicalization allows them to also stand in justificatory relations.

(Seager 1999: 180)

Peacocke (2001a: 256) argues that it is not necessary for the reference of the perceptual demonstrative to undergo conceptualization—‘thought can scrutinize and evaluate the relations between nonconceptual and conceptual contents, and obtain a comprehensive view of both’. Perceptual demonstratives appear to provide the possibility of an open intentionality, a consciousness *of* something which is not immediately a consciousness of that thing *as* something. It is thing-awareness without that-awareness.

9.3.3 Supplemented and unsupplemented perceptual demonstratives

Perceptual demonstratives may include some existing conceptualization, as with the examples given above of ‘that shape’ or ‘that interval of time’. In these, the concepts <shape> and <interval of time> are respectively deployed. Michael Luntley (2003) points out that perceptual demonstratives supplemented by sortal concepts, such as <that colour>, are composed of conceptual components—for instance, <colour> is a concept. A subject employing the supplemented demonstrative <that colour> is employing a component (<colour>) for which they possess the concept and which they therefore must be able to use in inferences. For example, if the subject also possessed the concepts of brightness and attractiveness, they would be capable making the following inference:

That colour is bright.

Bright colours are attractive.

That colour is attractive

(Luntley 2003: 410)

I think Luntley is making a mistake with this argument. To see that <that colour is bright> is, in Dretske’s (1993) terminology, is to be ‘aware-that’ rather than ‘aware-of’ the brightness of the colour. That is, it is ‘fact-awareness’ rather than ‘thing-awareness’, ie. the brightness of the visual experience has been conceptualised. The fact that the colour is not identified (as eg. magenta) does not prevent the identification of the visual experience as bright from being a conceptualization. ‘Brightness’ is conceptual because it already has existence outside of present perceptual contents, it is capable itself of figuring in inference—and its use here indicates that we are not dealing with a perceptual demonstrative. On the other hand, if <brightness> was introduced as a concept which linked two perceptual demonstratives, the result would not be

inferential integration outside of the present perception but rather the conceptualization of the *relation* between two percepts simultaneously available to the subject. Thus, we might say *<that₁, colour> is brighter than <that₂, colour>* (or, *<that₁, pitch> is lower than <that₂, pitch>*). There has been a conceptual linking of two nonconceptual percepts, and what survives outside of the present perceptual experience in this case is the relation between the two percepts.

There also exists the possibility of what Peacocke (2001a: 246) calls 'unsupplemented' perceptual demonstratives. Peacocke (2001a: 245) argues that the demonstrative *<there>* refers to a location without relying on the general concept of *<place>* or *<location>*. The example of *<that object>* can easily be reduced to *<that>*, and in fact the automatic, nonconscious mechanism which provides the proto-concepts 'object' and 'event' indicates that the supplement of *<object>* or *<event>* is not necessary in all cases.

Demonstrative concepts are unlike true concepts in that they do not exist apart from the perceptual experience which underpins them:

Perceptual-demonstrative concepts are available to a thinker only when he enjoys the perceptual experiences which help fix their references (when they do refer). Recognitional concepts are available to a thinker at times when there is no perception of their apparent references. Correspondingly, recognitional concepts rely on memory capacities in ways in which perceptual-demonstratives do not.

(Peacocke 2001b: 611)

As with relational perception for action, the nonconceptual perception which underpins perceptual demonstratives are a feature of the perceiver's situation in space and time; they belong to the here and now.

9.4 Nonconceptual hearing in music

9.4.1 Modular processes in music

Since this chapter is about the contents of perceptual experience, the internal mechanisms of modular processes are not of concern. However, it will be worthwhile to clarify the issue of the inclusion in the contents of experience of the output of computational processes. Naomi Cumming (1993: 52) quotes Ray Jackendoff's 'hypothesis of computational sufficiency', which expresses the belief that 'every phenomenological distinction is caused by/supported by/projected from a corresponding computational distinction'²⁴ (note that Jackendoff's 'computational' is equivalent to my 'modular' or 'encapsulated' in this case). In this view, conscious perceptions of musical structure (like perceptions of everything else) would consist only in the output of modular processes and an adequate description of conscious perceptions would be a description of the modular processes underpinning them. Conversely, an adequate formulation of the rules governing the computational processes of perception would account for

²⁴ Ray Jackendoff (1987) *Consciousness and the Computational Mind* p276

all conscious perceptions. DeBellis recognizes the issue but is only concerned to demonstrate nonconceptual hearing of music, whether or not it is the result of computational processes (1995: 14).

An example is the modular process of beat entrainment (musical entrainment). Musical entrainment is the process by which we are able to tap in time to music. Entraining is more or less involuntary—it is usually not possible to avoid perceiving a beat in music or other rhythmically regular sound that we hear. Entrainment is thought to depend on error correction processes applied to the period and phase of an endogenous oscillator in the brain. The subpersonal mechanism in effect predicts where the next beat will fall, and in the process produces durations which are matched to regularities in the music. In generating the perception of a beat, entrainment produces regular durations, the temporal intervals between beats. Prediction of where a regular beat will fall is useful for various actions, such as riding a horse or walking at the same speed as a companion, or adapting actions to any regular process such as might be produced eg. by the effect of waves on a boat, or the mechanical processes of a machine. This is an example of nonconscious magnitude matching for action.

However, I definitely do not agree that perception is entirely determined by subpersonal rule-governed processes. Processes which are encapsulated and inaccessible to central monitoring tend to produce outputs which carry self-sufficient meaning. The automatic processes which differentiate an object in the visual field from the background do not rest on a network of relations in conscious perception for their operation. Relational perception, on the other hand and as noted above, is in the service of conscious intentions to act—such as choosing and executing movements or classifying objects.

Processes which are completely cognitively impenetrable are determinate; where different computational processes conflict (as sometimes happens with auditory stream segregation) either one process wins out or there is a grey area where the way something is heard is a matter of learning or choice. For instance, despite its dependence on a subpersonal modular process, entrainment is not completely cognitively impenetrable. Although we are susceptible to cues which are not transparent to cognition and relate to parsing the beat (to find the period) and grouping onsets (to establish phase), we have some freedom to choose different beats and meters to fit what we hear, and our choices are influenced by what theory of music we implicitly hold (see Chapter 4). Further, expertise in accurate entrainment (as demonstrated by tapping) can be learnt with practice, resulting in lower values of variance in the period, and more effective error correction (Pressing and Jolley-Rogers 1997).

9.4.2 DeBellis's argument for the nonconceptual content of music perception

Mark DeBellis, in his *Music and conceptualization* (1995) argues for nonconceptual content in music perception. DeBellis (1995: 65) notes that the concepts we possess are those which we can recognize. We have a perceptual concept of a tune (say, 'Happy Birthday') because we can recognize it: we are capable of the perceptual belief that "Happy Birthday" is being played.

Individuals who have perfect pitch are able to recognize any pitch and (assuming the listener has learnt the correct names for the pitches) are able to name them—this requires the conceptualization of absolute pitch locations (DeBellis 1995: 63).

Slightly more relaxed than DeBellis's notion of pitch conceptualization would be relative pitch, where the listener could reliably recognize pitches as being a particular scale degree in the current key—this would amount to a conceptualization of the precise relations between pitches. Similarly, the simple ratio rhythms to which complex ratio rhythms are assimilated in categorical rhythm perception are the rhythms we can recognize because we possess concepts of them. However, an ordinary, untrained listener cannot reliably match instances of the same pitch in a melody, where these do not occur side by side (DeBellis 1995: 62). DeBellis points out that it is not that untrained listeners simply learn to apply labels to concepts they already possess—they must work at learning the perceptual concepts of scale degrees (DeBellis 1995: 64).

(Note the interesting fact that it is the relationships between pitches which define melodies, rather than the absolute pitches themselves. In Dretske's (1981) analog-digital terms, the sequence of absolute pitches which make up a melody are a digitization which has nested in it the information about the relationships between the pitches but which does not represent the relationships directly. This is an example of how digitization can lose the analog representation of salient aspects of music.)

The fact is that the same untrained listener who has no conceptualization of absolute pitches or of pitch relationships may still possess the concept of the tune 'Happy Birthday'. Since the concept of the tune, which the listener possesses, depends on the representation of pitch relationships, and the listener does not possess concepts of pitch relationships, they must represent them nonconceptually. DeBellis (1995: 65) thus argues, in line with Peacocke (see above), that perceptual concepts are underpinned by nonconceptual representations.

The same argument applies for the harmonic progressions which define particular pieces of music. It is not necessary for a listener to have any concept of a chord progression or the harmonic function of any particular chord (even a simplistic one), in order to be able to recognize a piece of music by means of (at least in part) its chords. For instance, nearly everyone in our society can recognise the twelve-bar blues form but there will be many who can recognise the form who have no concept of the number of bars in the form, the relationship between the I, IV, and V chords, or even of the idea of a chord progression.

DeBellis (1995) draws on Leonard Meyer's (1956) notion that expectation is an essential element of music: when we hear the dominant (in functionally harmonic music) we expect the tonic to follow. As DeBellis explicates Meyer's ideas, we assign different subjective probabilities to various possible continuations of the music—we will be more or less surprised by what happens next in the music. DeBellis calls the set of subjective probabilities for various continuations an 'expectation matrix'. Assuming a probability of 1 for a tonic following a dominant—that is an expectation that a tonic will certainly follow the dominant—DeBellis asks

whether the expectation matrix in this case can be considered to constitute a belief. According to DeBellis, it does not. The fact that two chords at different times prompt the same expectation does not entail that they sound alike, or be apt to be judged as alike. Thus, recognition of dominant chords is not required in order for the listener to experience their functioning as dominant chords (DeBellis 1995: 66).

DeBellis's argument seems sound, as far as it goes. An account of the perception of harmonic relations in music (both scale degrees and chord functions) provides a more detailed characterization of the contents of perception in terms of relational perception without conflicting with DeBellis's argument for nonconceptual perception.

The (major) diatonic scale which remained after other modes were gradually dropped from use prior to the eighteenth century has properties of asymmetry in its interval structure which serve to fix the tonic. The scale (like the other modes) has a single instance of an augmented fourth between two of its degrees (for the major scale, between the fourth and seventh scale degrees). The intervallic relationships between the scale degrees serve to unambiguously define which note is the tonic. It is possible to avoid the fourth and seventh degrees (which then makes the scale ambiguous between three major scales with different tonics) but that is precisely not the practice of composers in this style. The key is defined by the relationships between the various notes of the scale and individual scale degrees are defined against this background. While it is sufficient for the perception of scale degrees to hold concepts of the relations between them, it is not necessary. Relations between scale degrees can be apprehended nonconceptually from tones instantiated in present perception.

The perception of harmonic function can be accounted for in a similar way. In particular, the dominant of a key contains both the scale degrees which define the only augmented fourth (or diminished fifth, depending on the voicing of the chord) which occurs in the scale. The tonic, like the other chords which are common resolutions of the dominant in the style, contains neither of those scale degrees. The dominant-to-tonic progression is thus also unambiguously defined in terms of relations between pitches. Once again, (analog) perception of the relationship between pitches does not require recognition of the chord shape or conceptualization of the relation between the two chords.

9.4.3 Relational perception and polysemy in music

I noted above that the defining difference between Dretske's analog and digital signals is that the information which analog signals carry is not restricted to a single item, that analog signals carry 'additional information' which a digital signal does not. In Dretske's terminology, completely digitized representations (such as knowledge and beliefs) are distinguished from analog representations in that they have digital contents which are exclusive of any information not nested in them. Dretske (1981: 178ff) calls such exclusive digital content 'semantic content' and distinguishes it from 'informational content'. A semantic structure (digital conversion unit) processes incoming information (such as visual information) to produce a digital representation

(such as that *t* is a triangle). It will ignore information such as that *t* is red, its size, or the precise configuration of its angles—in my terminology, it will generalize over these differences. The very same representation in this particular semantic structure would be produced by an incoming sensory signal relating to a blue triangle, an equilateral triangle or an isosceles triangle.

Similarly, Haugeland's logical representations are composed of elements (the words of a sentence are one example) which are always identifiable separately and individually. The concrete relations between them, if any, do not contribute to the representational content in any way. This recalls Shepherd and Wicke's characterisation of linguistic representation, given in Chapter 2:

The abstract as opposed to material character of the logical structure of linguistic propositions arises[...] because it has no material *connectedness* [...] *either* to the material conditions of the world *or* to the material conditions of language. [...] Signifier and signified must remain quite distinct from one another[...]

(Shepherd and Wicke 1997: 137, italics in original)

Relational perception can be contrasted to digitized or logical representations in that it carries a rich set of relations between properties of those objects which are present to perception, a set of relations which approaches the real world in its complexity. Inasmuch as analog representations are like models of the world, they instantiate relations which need not be explicitly specified. This is one of the reasons why we make models of the world. For example, we can make a map of an area by plotting the direction and distance of *x* from *y*, and *z* from *x*, then look to see the direction and distance of *z* from *y*. In the same way, there is an interdependent synthetic unity to perception. We can see *a* as being to the right of *b*, and *b* as being to the right of *c*; we do not then need to infer that *a* is to the right of *c*—it will be available directly to perception, as will a thousand other relations.

Attempting to specify the relations in even a simple tune quickly shows that they are apparently inexhaustible—particularly as sets of relations at one level define objects which exhibit a new set of relations at a higher level. It is from among this plethora of relations that we pick perceptual demonstratives. The <that> to which a demonstrative refers may be at any of several levels of a part-whole relationship (a bicycle spoke, or the whole wheel; a single short musical event, or an antecedent-consequent pair of events). Not only this, but there are potentially available different wholes, with overlapping constituent parts, and which are therefore mutually exclusive. Recalling Dretske's (1993) distinction between thing-awareness and fact-awareness, remember that there is no property *F*'such that an awareness of a thing which is *F* requires an awareness of the fact that it is *F*' (268). Thus there may properties which exist of which we are not fact-aware, perhaps because we do not possess the appropriate concept. In addition, we can find different levels of abstraction in percepts: we might distinguish each of circles, squares, and triangles; or we might only differentiate curve-sided shapes (circles) from straight-sided shapes (squares and triangles)—generalizing over the number of sides in the

straight-sided shapes. So it is possible that there are properties for which we possess the concept but which are nevertheless excluded from a particular fact-awareness which generalizes over the differences in those properties.

Relational perception, in contrast to the exclusiveness of digitized or logical representations rather preserves as part of the apprehension the concrete relations between immanent percepts. Relational perception is thus potentially infinitely rich in its representation of relations at different levels and between levels of the part-whole relationship of the object of perception. It is my view that the polysemy and indeterminacy of meaning in music relates largely to this property of relational representation. Susanne Langer saw the high level of complexity of relations as a feature of musical and artistic expression:

Some domains of experience and understanding fall readily into the discursive forms of language; but we are also able to apprehend and manipulate patterns that have "too many minute yet closely related parts, too many relations within relations" [*Philosophy in a New Key*] to be adequately expressed in the medium of discourse.

(Dryden 2007: 28)

The richness of relational perception is lost when a logical or digitized representation is extracted from it. DeBellis notes as a puzzle that a music analyst is often able to recognize an analysis as true to the way they heard the music prior to undertaking or reading the analysis, while at the same time feeling that the analysis is informative for them (1995: 76-78). Consider that they might have rejected the analysis as incorrect to their previous hearing. DeBellis compares such occurrences with statements which we recognize as statements of one of our beliefs (eg. 'Bill Clinton is a Democrat'), which is not informative, and therefore not interesting, to us. The puzzle is, how can the analysis apparently reveal something to the analyst, when they are the authority for its correctness in the first place? The paradox leads DeBellis to consider abandoning his stance that hearing and analysis are epistemically equivalent, and I think this is the right move. In my view, any analysis is a digitization of the analog representation which is the hearing of the music. Thus, it is not just that the analysis makes the listener aware that one hears a passage in a certain way (which DeBellis rejects as intuitively unpersuasive); but that it is one possible digitization which is congruent with the listener's much richer analog perception of the music.

My argument here should not be taken to mean that I think there is only one way to analogically perceive a piece of music. Different individuals may be more aware of some relations than others, and this may also apply to a single individual listening to the same piece of music at different times. What this suggests is that the process of generalisation and abstraction is active and cognitive, not the output of a rule-governed computational process. Computational outputs—perceptual groupings, auditory stream segmentation, and so on—are what will be common to different hearings.

9.4.4 Processuality and nonconceptual content

In Chapter 2, I noted Susanne Langer's (1953: 109-10) claim that music creates an image of time in sound (the perception of which is inherently transitory). In *Philosophy in a New Key*, Langer proposed that

the dynamic tonal forms found in music might serve as a symbolic formulation of "the ever-moving patterns, the ambivalences and intricacies of inner experience" [...] that language cannot express.

(Dryden 2007: 28)

The notion of 'ever-moving patterns' in the quote from Langer chimes with the evanescent nature of nonconceptual perception. Relational perception depends on the availability of the perceptual stimulus in the here and now—recall Peacocke's statement given above, that 'Perceptual-demonstrative concepts are available to a thinker only when he enjoys the perceptual experiences which help fix their references' (Peacocke 2001b: 611).

I want now to suggest the possibility of novel apprehensions, dynamically abstracted over a series of musical objects in the specious present. Consider a series of short melodic motifs which have some recognizable similarity to each other but which are not identical. The practice of motivic development and transformation is a staple device of classical music and there are recognized procedures which can be used. The motif can be transposed without alteration, the contour can be retained while the intervallic structure is changed, rhythmic diminution or augmentation can be carried out; and all of these transformations can be applied in various combinations. Each of these provides immanent percepts which are perceptibly different, in the same way that different angles of view of a triangle, or the same word spoken by different people, are different. But, just as the different views of a triangle or the same word as spoken by different people can be assimilated to a single observational concept, each motif can be heard in relation to others as the instantiation of an abstract nonconceptual idea.

Described in this way, the perception of a series of motifs taken as whole can be seen as the apprehension of a novel demonstrative perceptual concept. Just as with Berkeley's triangle, no particular property of a single concrete instantiation can be assumed *a priori* to belong to the abstract idea. The particular abstraction which the series points to will depend on the commonality between the individual motifs. Contrary to the idea of a triangle, however, there may be no formal definition available for the apprehension which unifies a series of musical motifs nor is there necessarily an established, publicly-known observational concept to which the motifs can be assimilated, such as, for example, an objective Schaefferian sound object.

There is another level of processuality, however, which is associated with motivic transformation. Consider that motifs *a*, *b* and *c* might share some property which can be abstracted from the series; motifs *b*, *c*, and, *d* might share a different property; and motifs *a* and *d* might share a different property again. For instance, *b* and *c* might invert the pitch

contour found in *a* and *d*, while *a*, *b*, and *c* share a common rhythm and *b*, *c*, and *d* utilise the same pitch intervals. The apprehension which unifies a succession of motifs with such complex interrelations will be dynamic and labile. Furthermore, we can be aware of second-order relationships, that is, relationships between relationships—for instance, the fact that the first and fourth in a series share a common property not shared by the others, which have other properties in common. The richness of relational perception, combined with the processual nature of music, is ideally suited to present the ‘ever-moving patterns, the ambivalences and intricacies of inner experience’ which Langer found in music.

9.5 Summary

In this chapter I have argued for conscious nonconceptual perception in music in terms of relations between magnitudes. Sets of relations between elements of immanent percepts are abstracted to provide apprehensions. Apprehensions may alternatively be a concept (eg. <degree five of a major scale>), the conceptualisation of relative magnitudes (<perfect fifth from the tonic>), or a nonconceptual apprehension (eg. of a melody utilising various scale degrees and intervals).

Conceptualisation involves a reduction of information about the concrete relations between different elements of the perceptual field. Nonconceptual relational perception abstracts across a series of immanent perceptual events so that a rich set of concrete relations between different percepts, approaching the real world in complexity, is retained as part of the representational content. Their content is richer and at the same time less determinate than completely digitized representations. I have suggested that the richness of relational perception is one source of polysemy in music. However, it is only via conceptualisation (as in an analysis of a musical work) that such relations can be made explicit to the listener. Relations between relations are a second order of abstraction which (I argue) is available to nonconceptual perception.

The isomorphism of relations as represented in perception and relations in the environment is the means by which perception can escape sedimented perception and abstract novel patterns from experience. Nonconceptual perception of the everyday world is situated in a specific here and now and its indexicality means that it carries information not only about the world but about the relation between the perceiver and objects in the world. Nonconceptual content can therefore feed directly into the control of motor actions. I argue that nonconceptual relational perception is active and cognitive, rather than the output of an automatic, rule-governed process.

I have reviewed Mark DeBellis’s argument for nonconceptual hearing in music, and argued that it is consistent with nonconceptual hearing as relational perception. The fact that relational nonconceptual perception preserves in its representations the richness of relations between concrete elements in the immanent percepts accounts for the polysemy of music. The

processuality of music perhaps relates to the labile nature of perceptual demonstratives, as successive similar-but-different immanent percepts are assimilated to an evolving apprehension.

10 Motor creativity in music performance

10.1 Introduction

In this final chapter, I address the problem of how novel organisations of fine-grained patterning of timing and dynamics can be produced in musical performance. In the preceding chapters, I have shown how conceptual perception can result only in perceptions which fall under concepts already possessed by the perceiver. This is sedimented perception, the opposite of perceiving novel configurations of musical elements. I have shown that nonconceptual perception depends on percepts which are in present experience—and not, for example, imagined percepts, such as are used in eidetic variation. All this creates a problem for the musical performer: if novel configurations of music elements cannot be imaged prior to their being performed, how else can they be produced? In this chapter, I propose a theory of creative music performance in which novel configurations of elements are performed without first being imaged by the performer, in a process of motor creativity.

First I review Carruthers's Creative Action Theory of creativity, which shares significant similarities with my own theory of creative music performance. Carruthers begins by offering dance and music performance as examples of creative action without prior representation of actions. However, he goes on to argue for a theory of mental rehearsal of possible actions as underpinning creative thought. I identify a circularity in Carruthers's broader model: action schemata are described as giving rise to images representing the action in question, but the motor schemata themselves are, in Carruthers's account, already dependent on a conceptual representation of the proposed action. Accordingly, I proceed to an investigation of the basis of the sedimentation of action goals.

Motor action effects which are first represented as goals (before execution of the action) are subject to sedimentation of previous actions and perceptions in much the same way as perception is subject to sedimentation of previous perceptions. According to Joëlle Proust's (1999) explication of the structure of intentional action the normativity of motor action is due to the origin of individual actions in the learned association of motor commands with sensory effects: these become the goals which are available to the agent. The link between motor action goals and motor commands comes about over time through the repeated association of particular sensory effects with particular motor commands in an appropriate context of desire. The association is at first accidental and then develops into a motor action for the achievement of a (motor) goal. It is developed partly through the operation of nonconscious 'forward models' in the brain, which generate internal information about the expected sensory input at each

stage of the action, for comparison with actual sensory input and correction of the ongoing action movement.

Given this sedimentation of goal representation for motor actions, I consider the possibility of meaningful actions without goal representations. An alternative kind of motor action was defined by Merleau-Ponty (1962) in terms of 'motor intentionality'. As described by Hubert Dreyfus (1996; 2002a; 2002c; 2002b), motor intentionality exhibits 'skillful coping' without goal representations. I argue that perception for skillful coping underpins the kind of conscious nonconceptual relational perception described in Chapter 6 of this thesis.

Forward models of motor actions predict both the state of the organism and the expected sensory input resulting from the action, and operate nonconsciously to provide feedback for control of fast motor actions (Wolpert, Ghahramani et al. 1995; Wolpert 1997). 'Inverse models' are the motor commands generated to achieve an action. I argue for the involvement of forward models for motor actions in cases where goals are consciously represented and the absence of these where conscious representation is absent—that is, specifically in the movements made in skillful coping. I propose a mechanism for skillful coping which relies on the dynamic combination of inverse models (Wolpert and Kawato 1998; Davidson and Wolpert 2004) without forward models.

I discuss the ways in which Dreyfus's notion of skillful coping seems applicable to music performance. For instance, nonconscious perception for action can be argued to underpin conscious nonconceptual relational perception, so that actions based on nonconscious perception might be expected to be compatible with apprehensions arising out of nonconceptual relational perception. Also, skillful coping is an embodied response to the whole situation of the agent, rather than a response depending on propositions about some of its features. However, it is not easy to account for creativity using the model of skillful coping, since skillful coping appears to depend on an overarching goal which is built into the learned scope of behaviours in a given type of situation. Creativity, in contrast, presumably depends on the flexibility of human consciousness. In many cases, the overarching goal which skillful coping subserves will have been originally specified via representation (as when learning to drive a car or learning to play tennis). On the other hand, where an implicit goal has been inculcated through eg. social mores (such as maintaining appropriate social distance) the agent is constrained by virtue of habitus. This would seem to militate against creativity. I speculate that it is precisely the lack of a goal—whether explicit or implicit—in the kind of music performance I have described which allows for the possibility of creativity.

10.2 Carruthers's Creative Action Theory of creativity

Peter Carruthers (2007) proposes a model for a 'creative action theory' of creativity which is partly consistent with the one I propose here. Carruthers proposes that there are creative

actions which are neither preceded nor caused by creative thoughts. He suggests jazz music and dance improvisation as examples of creativity of action, rather than of thought:

For the novel movements seem to be made “on-line,” sometimes extremely swiftly, and without prior reflection or planning—or at least without *conscious* reflection or planning.

(Carruthers 2007: 257, italics in original)

Carruthers (2007: 257) rejects unconscious planning with thoughts immediately prior to execution of such actions, specifically because of the fine-grained control evident in skilled improvisation. It is not just conceptual actions which are produced (for instance, the particular notes played in a particular, conceptualized rhythm) but the precisely controlled detail of rhythm, timbre, intonation, loudness, articulation, and so on. Skilled action control, he argues, has a nonconceptual—or at least analog—aspect. Performance differs from perception in that demonstrative perceptual concepts of the way in which the dancer moves their arms and legs, or the musician produces the sound, are not available until those movements and sounds are produced (Carruthers 2007: 258). Planning cannot therefore be in terms of demonstrative perceptions of what is to come. The other possibility, that they are grounded in demonstratives of images of what is to come, Carruthers dismisses as implausible. For one thing, evidence exists that motor images themselves are caused by activating the appropriate motor schemata. Since there will not be time for evaluation and correction in a performance situation, the motor schemata might as well be carried through directly to action without the generation of a motor image. In addition, Carruthers notes that jazz improvisers are often surprised by their own products—evidence that their actions are not even the subject of unconscious expectation.

Carruthers's main thesis is that motor action creativity underpins all forms of creativity. His argument for the primordality of action creativity depends on the idea that although novel action schemata might bring about novel actions directly (as with the improvising dancer and the jazz musician), they might alternatively generate perceptual material (visual images or musical objects) which are further processed by cognitive systems (Carruthers 2007: 259):

We need a way for a creative idea generator to be embedded in a wider set of inferential systems in such a way that the implications of a new idea can be developed and evaluated before that idea is believed, adopted, or put into practice.

(Carruthers 2007: 254)

Thus, Carruthers departs from the direct action model of unplanned motor creativity in music and dance performance to develop a broader model of an ‘action-first’ account, which involves the generation of hypothetical suppositions in the form of ‘activated and rehearsed action plans or act schemata’ (2007: 256):

A creatively assembled action schema is activated and rehearsed, giving rise to an imagistic representation of the action in question. The latter is then broadcast to the various inferential, belief-generating, and motivational systems, which further elaborate and evaluate it. Recall that the main puzzle about the act-first account of creativity is how *action* can give rise to *thought*. This question is now readily answered. For the mental rehearsal of an action schema will give rise to an imagistic thought representing the action in question[.]

(Carruthers 2007: 264, italics in original)

The images which are generated by mental rehearsal of action schemata are produced by 'forward models', which predict the sensory effects of action schemata. I will leave aside forward models for the moment (I address them below)—what creates a difficulty in Carruthers's account is that the forward models themselves depend on a conceptual representation of action:

A conceptual representation of a proposed action, produced by the practical reasoning system, is used to construct a corresponding motor schema. This is then [...] transformed into visual representations of the movements involved.

(Carruthers 2007: 263)

The problem with this is that the mechanism of the broader model requires evaluation of randomly generated hypothetical actions. The fact that these are themselves apparently represented conceptually excludes the possibility of direct creative action without representation.

I suspect that the stumbling block for Carruthers is the issue of how unrepresented actions can be meaningful. His broader model of motor creativity as underpinning creative thought appears to evade this difficulty by relying on randomly-generated actions which are potentially meaningless and which therefore require evaluation prior to execution. Since evaluation in thought depends on a representation of the action goals, the action goals are not, finally, unrepresented at all. It is at this point that Carruthers's account and mine part company. The essence of performance, in my view, is just the fusing of thought and action in an immediately executed response to the current situation.

In this chapter I will attempt to describe a model of action creativity which integrates ongoing direct creative action with conscious perception of the results of just-performed actions. The way to avoid both horns of the dilemma—meaningless on one hand, representation on the other—is to find a way in which unrepresented actions can be meaningful. The first step in doing this is to investigate the structure of goal-directed actions.

10.3 The sedimentation of action goals

For a musician to be creative in performance, the effects of their motor actions must be novel (to themselves) in a meaningful way. In this section, I aim to show that motor action effects which are first represented as goals (before execution of the action) are subject to the constraints of sedimentation in much the same way as perception.

The coding of perceptual content and action goals in a common representational domain has been persuasively argued (see, for example, Prinz 1997; Hommel, Müsseler et al. 2001). Such a representational system would contain information about the 'spatial and temporal pattern of happenings in the distal environment' (Hommel, Müsseler et al. 2001: 853). The idea that voluntary actions come into being by anticipating their distal effects had been put forward in the nineteenth century by William James (1891) and R. H. Lotze (Hommel, Müsseler et al. 2001: 860), and experimental evidence of a two-stage learning process of bidirectional action-effect associations in adults has been reported by Elsner and Hommel (2001). Behaviours are first associated with the perceivable effects they produce; these associations then form the basis for selecting actions that produce desired effects. Such an account, brief as it is, seems sufficient to establish the sedimentation of action. If perceptions are normally sedimented (as argued in Chapter 1) then action goals represented in terms of those perceptions must also be sedimented. Joëlle Proust's (1999) detailed explication of the structure of intentional action develops in just this direction but also shows where the sedimentation of action can be escaped.

A central difficulty for philosophers in trying to establish a causal link between intentions and action effects is the existence of two disparate codes for actions. One is what Proust calls the semantic dimension of action, which can be consciously accessed and memorized, and expressed verbally. The semantic dimension relations to the intended effect of the action. Proust opposes to this the pragmatic dimension, which involves an egocentric representation of action, quickly forgotten and elusive of verbal expression. Thus, to perform an action such as 'to drink from a cup for coffee', movements need to be generated which take account of the precise position of the cup relative to the body of the person making the action. The problem is to establish a causal link between the two 'potentially incommensurate representational formats' (Proust 1999: 5), the semantic and the pragmatic dimensions of action. Proust offers three elements of action towards the solution of this problem. The third element, 'deictic reference' is not relevant to the present argument. The first and second elements (which are relevant) are, respectively, historical-teleological connection and feedback.

The historical-teleological element of action is just the association of behaviours with their perceivable effects, as described above. Actions are acquired, as well as intended, in terms of their effects—but the historical-teleological account is required to explain this:

Given that there exists apparently an infinite number of possible movements compatible with a particular action, there seems to be no causal link that could warrant the unicity of the action considered semantically, i.e. through its intentional content, and the action considered motorically, i.e. through its pragmatic content.

(Proust 1999: 8)

In Proust's terms, the teleological connection between action and effect comes about in this way:

To be able to do X in order to get some desired result P it must be the case that:

- (1) in the past, tokenings of X produced randomly P in P'-motivated contexts,
- (2) the very fact that former tokenings of X produced P caused a new token of X to be activated in new P'-motivated contexts.

(Proust 1999: 12)

While the first token of the action type (action X, in the preceding paragraph) must have included some particular pragmatic content (some particular movement or movements which were made to achieve it), the action is defined neither by that pragmatic content nor by the pragmatic content of any subsequent token of the action type:

As the distal effects coincide with the external outcome of the action, it is through the semantic properties of the action (that it has such and such a consequence on the perceived external world) that an action is represented and stored. Lower-level pragmatic representations are thus subsequently activated by the "higher-order" goal.

(Proust 1999: 11)

The historical-teleological connection between tokenings of actions is responsible for the sedimentation of action—it is because the effects of a particular action are of a particular type that it is subsequently performed in a particular kind of motivational context:

Normativity is a pervasive characteristic of action: not only is a bodily movement *caused* by prior learning; the system *anticipates* the reafferences, and [...] "approves" the correct development of action on the basis of expected sensory feedback.

(Proust 1999: 13, italics in original)

The other element linking semantic and pragmatic aspects of actions is feedback. The concept of feedback in the course of motor actions is required to distinguish intentional action from actions brought about through 'deviant causal chains'—such as the hypothetical case of the nephew who drives to his uncle's home in order to kill him with a gun and by mistake runs over and kills a pedestrian who happens to be his uncle (Proust 1999: 4). In terms of simple motor actions, we might think instead of trying to slide a spatula under a frying potato in order to turn it over and accidentally pushing the potato against the side of the frying pan so that it turns

over the other way. Feedback on the course of the action in this case tells us that our action intention was not carried out (although the final effect was consistent with it). Proust introduces the notion of 'feedforward signals' (1999: 7) (or 'forward models') which generate internal information about the expected sensory input at each stage of the action, for comparison with actual sensory input. Forward models can be seen as linking the pragmatic aspect of the action—the actual movements made to achieve the goal—with the semantic aspects—the goal itself, specified in terms of sensory effects.

The application of Proust's account of intentional action to music performance would see the performer executing actions (perhaps one action per beat, or encompassing a few beats together) in accordance with action goals which had been achieved before and presumably were conceptualized. Such a model allows for some flexibility and creativity, for instance in the choice of which conceptualized action goal to apply in each case. If a given musical event (ie. a short passage capable of being encompassed in one action) is susceptible to different interpretations, it can be assumed that at least some of these interpretations can be conceptualized and reproduced at will, so that the performer would have a choice of action effects. I have no doubt that some music performances are accurately described by an action goal account. However, action goals, since the goals are conceptualized, are incompatible with nonconceptual action, which Carruthers (2007) claims for skilled action control (see above). Nor can it account for the surprise performers feel at hearing the results of their own actions, as described by Carruthers (above) and by the hardcore musicians interviewed in Chapter 1.

10.3.1 Forward and inverse models and the historical-teleological connection

It will be fruitful to consider in more detail how what Proust calls the 'semantic' and 'pragmatic' dimensions of motor action are effectively linked in the historical-teleological development of goal-directed actions. The generation of motor schemata and the feedback for motor actions in progress are complementary issues, relating to what are known as 'inverse' and 'forward' models. Inverse and forward models in motor control relate respectively to Proust's pragmatic and semantic dimensions.

The term 'inverse model' relates to the working back from the desired goal to the required motor program, and contrasts with forward models, which predict the result of the motor program. First, in the motor planning stage there is an 'inverse model controller', which selects a precise motor program to achieve the desired goal—for the sake of a concrete example, this might be picking up an object which is within hand's reach (Wolpert 1997). The ability to fine-tune the movements of an action to the specific situation is accounted for by the weighted combination of different inverse models (Wolpert and Kawato 1998).

Wolpert (1997) distinguishes between forward dynamic models, which predict the next internal state of the system given the current state and the motor command; and forward output models, which predict sensory feedback, given this estimated state. The output of forward models can be used to generate corrections to the movement during its progress, by

comparison between the predicted state and the actual state, and between predicted sensory feedback and actual sensory feedback. It should be understood that the processes of inverse and forward models are very fast and are not available to consciousness.

Proust notes that, given the infinite number of possible movements which could be used to achieve a goal, some mechanism linking movements to actions goals is required in order to allow the actor to think in terms of the goal. Proust (1999) identifies forward models as linking the representation of the action goal (the semantic dimension) to the pragmatic dimension of movements through feedback on the progress of the action towards achieving the goal. However, she glosses over the details of the connection between the pragmatic and semantic dimensions, between the inverse model and the representation of the action goal.

The pragmatic dimension can be usefully thought of as consisting in two functions: choosing the movement path which will satisfy an action goal, and generating a movement command (inverse model) which will result in the muscles carrying the limb along the chosen movement path. Our actions are usually sure enough that we are not prompted to think of the two functions separately. Think of a simple action such as picking up a ball which is within reach of an adult on the floor on which they are sitting. At one extreme, the model described by Proust might operate in terms of a completely random movement which is progressively corrected on the basis of feedback from forward models, until the goal is achieved. Of course, we know that is not what happens. Rather, an accurate inverse model is produced which requires little or no correction during the progress of the action. We can even sight the ball, close our eyes, and pick it up in one swift movement.

Inverse models of particular movements are indexical in the way nonconceptual relational perception is, they deal with magnitudes and directions relative to the immediate situation of the organism. Particular movements (and inverse models) have no inherent relation to the action goals they subserve. Just as a goal might be achieved through any of a potentially infinite number of possible movements, a particular movement might subserve a multitude of different goals, depending on the particular spatial situation of the organism in relation to the object to be acted on.

Action goals are conceptual, they are like properties of an object which meet Evans's Generality Constraint. Different actions can be conceived as applying to the same object and the same action can be conceived as applying to other objects. In order for the goal 'pick up ball' to become sedimented, the infant needs to learn to assimilate to the goal the different movement paths required to pick up the ball when it is in slightly different positions relative to their body. This is the essential function of forward models in linking what Proust calls the pragmatic and semantic dimensions. A movement along some path can be generated, and feedback from forward models constrains the movement in the service of a goal.

I have artificially separated the two functions to make an argument. Of course, in practice the two capacities, for accurate movement and for goal-directed action, develop in tandem.

Movements—which can be described purely in terms of the spatial relation between different parts of the body and not involving the external environment at all, and which inverse models represent purely in terms of particular muscle contractions—are learned by the developing organism as part of the learning of action goals. Once learned, however, inverse models can be invoked in the service of other action goals. The historical-teleological development of a wide variety of action goals results in the development of a repertoire of inverse models—including, perhaps, some rather sophisticated ones. These inverse models are the source, I would argue, of what Merleau-Ponty (1962) called ‘motor intentionality’.

10.4 Motor intentionality and skillful coping

10.4.1 Dreyfus’s skillful coping

Proust’s account of the requirements for intentional motor action provide a useful framework in which to discuss an alternative kind of motor action, identified by Merleau-Ponty (1962) as ‘motor intentionality’. As described by Hubert Dreyfus (1996; 2000; 2002a; 2002b; 2002c), motor intentionality exhibits ‘skillful coping’ (or ‘absorbed coping’) without goal representations. Merleau-Ponty’s (1962) concepts of the ‘intentional arc’ and ‘maximal grip’ are key to the notion of skillful coping:

The *intentional arc* names the tight connection between the agent and the world, viz. that, as the agent acquires skills, those skills are “stored,” not as representations in the mind, but as dispositions to respond to the solicitations of situations in the world. *Maximal grip* names the body’s tendency to respond to these solicitations in such a way as to bring the current situation closer to the agent’s sense of an optimal gestalt. Neither of these abilities requires mental or brain representations.

(Dreyfus 2002a: 368-69, italics in original)

Rather than being represented in the mind, what the learner acquires through experience is finer discrimination of situations which present themselves, which in turn call forth more refined responses. This is Merleau-Ponty’s ‘intentional arc’ (Dreyfus 2002a: 373). The fine discrimination of situations is a matter of classification (Dreyfus 2002a: 372) The point, however, is that the classifications are not mentally represented but are rather exhibited in the bodily response to different situations. If classification through motor intentionality entails the existence of some kind of inner state, then ‘the “inner state” in question could well be a body-set based on how my brain has been modified by my past experience’ (Dreyfus 2002b: 415; Rowlands 2006).

The notion of ‘maximal grip’ relates to perception and bodily responses to the current situation (Dreyfus 2002a: 378). Good examples of maximal grip can be found in how we might feel how a nut will fit onto a bolt (underneath a chair, say) which we can touch but cannot see; or again, how we adjust our bodily position in order to see what we are looking at in the way that best serves our present purpose—whether looking at a photograph to identify a face or looking

at a motorcycle engine in order to change a sparkplug. In cases such as this, we typically have no way of representing the changes we make, except as precisely the muscle movements we undertook in order to make them:

One feels that one's comportment was caused by the perceived conditions in such a way as to reduce a sense of deviation from some satisfactory gestalt. But that final gestalt need not be represented in one's mind. Indeed, it is not something one *could* represent. One only senses when one is getting closer or further away from the optimum.

(Dreyfus 2002a: 379)

Absorbed, skillful coping in motor action extends to larger and more complex actions than these, though. It is interesting that Dreyfus's two chief examples of motor action are driving a car (2002a: 368ff) and playing tennis (2002a: 378)—both activities involving ongoing, time-critical action, as music performance does:

[A]cting is experienced as a steady flow of skillful activity in response to one's sense of the situation. Part of that experience is a sense that when one's situation deviates from some optimal body environment relationship, one's activity takes one closer to that optimum and thereby relieves the "tension" of the deviation.

(Dreyfus 2002a: 378)

No mental representations of goals are required in this experience of flow—'It can be *purposive* without the agent entertaining a *purpose*' (Dreyfus 2002a: 379, italics in original).

10.4.2 Perception for action and nonconceptual relational perception

I alluded briefly in Chapter 6 to the suitability of nonconceptual perception for the control of action, given its situated nature which preserves both relations between objects in the environment and relations between the perceiver and the environment. I will now present an argument for perception for action as underpinning nonconceptual relational perception. Different authors argue for various aspects of the link between perception for action and nonconceptual perception. Samuel Todes (2001; but see Dreyfus 2002c) describes a process by which nonconceptual practical perceptual judgements provide the basis for conceptualization of qualities independent of the object they qualify, reidentifiable qualities of reidentifiable objects. Jennifer Hudin (2006) argues from Dreyfus's account of non-representational motor intentionality to the notion of nonrepresentational perceptual contents. Robert Briscoe (2008) argues for a common egocentric frame of reference for conscious visual experience and action guided by nonconscious visual perception. I shall present these arguments in that order.

Todes (2001) distinguishes between 'perceptual negation' as a positive lack that calls for a response, and 'logical negation', which is the absence of a specific something that could have been present. In perceptual negation, the agent's body is solicited to move 'so as to reduce a sense of deviation from a satisfactory gestalt without the agent being able to represent what that satisfactory gestalt will be like in advance of achieving it' (Dreyfus 2002c: 396). In

responding to perceptual negation, the perceiver makes the need and the object which meets the need determinate enough for the need to be satisfied. In this way, the essential indeterminacy of perception is masked by becoming determinate as it comes to attention (Dreyfus 2002c: 395). The activity of on-going coping provides perceptual knowledge because the self-produced movements of the agent's body in response to an anticipated object reveal the thing which has elicited the response (Dreyfus 2002c: 396).

Dreyfus gives the reidentification criterion for conceptual content:

The reidentification criterion states that, for a subject to possess a concept of an object or property 'x', the subject must be able consistently to re-identify a given object or property as falling under that concept if it does.

(Dreyfus 2002c: 402)

The practical perception described by Todes is capable of reidentification only in the sense that the whole, unified body of the perceiver gets a grip on the whole unified object in a specific unified context—that is, nonconceptually (Dreyfus 2002c: 402). It is only when satisfaction of a need is inhibited (or frustrated) that perceptual negation becomes logical negation and nonconceptual practical perception becomes conceptual (Dreyfus 2002c: 405).

Todes's account seems oriented towards the perception of static objects. However, where perception is of a continuing process in which the perceiver is actively involved (such as driving a car, a game of tennis, or a music performance) then perception might not have time to become determinate.

Jennifer Hudin (2006) has a similar account of nonconceptual perception related to skillful coping:

This intelligent physical negotiation includes perceiving situations as non-atomistic, interdependent wholes: the color of the coffee is part and parcel of the liquid that is part and parcel of the pot which itself is situated in and as part of a larger background. None of the pieces of the perceptual experience is ultimately isolable – each is rather a perceptual moment of how things are in the world for the perceiver.

(Hudin 2006: 579)

Perception for action is holistic, integrated and specific. Hudin goes further, however. Accepting Dreyfus's (2002a) characterisation of skillful coping as doing without representation, she argues that 'the perceptual experience involved in motor intentionality must itself be non-representational' (Hudin 2006: 579). Taken together, the arguments of Todes (2001) and Hudin (2006) provide support for the hypothesis that the nonrepresentational motor intentionality of skillful coping described by Dreyfus (2002a) underpins nonconceptual relational perception.

10.4.3 Forward and inverse models in skillful coping

I now want to recast the argument for nonrepresentational motor intentionality in terms of the inverse and forward models of motor actions discussed in an earlier section. In arguing for skillful coping, Dreyfus most often takes issue with the philosopher John Searle for his view that the 'experience of acting has the intentional content that the appropriate bodily movements are being caused by the intention to perform this action' (Dreyfus 2000: 289). The intention to perform the action currently being performed is an 'intention in action' (Searle 1983: 91) The 'intention in action' is a representation of the action, which is what Dreyfus maintains is not generated in skillful coping. However, in the case of unconscious actions, the intention to perform the action can cause the performance of the action without the agent being aware of that intention—for Searle, representation is a functional category which does not require the phenomenology of the experience of intending to act.

Recall Wolpert's (1997) distinction between forward dynamic models, which predict the next internal state of the system given the current state and the motor command; and forward output models, which predict sensory feedback, given this estimated state. Action goals are represented in terms of the sensory state which is the ultimate aim of the action (Prinz 1997; Hommel, Müsseler et al. 2001), and forward output models provide a progressive reading of the sensory state which allows feedback on the progress of actions towards their goals (Proust 1999). I propose that forward output models are generated in the case of goal-directed actions, and are absent in unrepresented skillful coping.

Part of my argument for tying forward models to goal-directed actions is that they are implicated in the representation of action effects. A forward output model is not a direct representation of the action goal but correlation of its progressively updated outputs with the sensory state goal allows corrections to be made to the motor action towards the successful performance of the action. While it would be possible for there to be no representation of an action goal and that forward output models were still present, their function in providing data for corrections toward the represented goal raises the question of their presence when action representations are absent.

A stronger argument for the absence of forward output models in skillful coping is phenomenological, however it does not relate to the experience of representation but to the experience of agency. Forward models have been argued as contributing to the sense of agency in the absence of a 'fully-fledged' intention to act (Bayne and Pacherie 2007: 479). The sense of agency apparently arises because forward models provide predictions of the sensory consequences of actions to the sensory system, which in turn enable us to determine what sensory inputs are the result of our own actions and what follow on changes in the external world. It is for this reason that tickling oneself doesn't work—forward models of the actions predict their sensory outcome, which is then cancelled by the sensory system. An experiment which used a mechanism to distort the time and direction of self-produced tickling

actions reduced the sense of agency so that participants were able to tickle themselves (Blakemore, Frith et al. 1999).

If forward output models are absent in skillful coping, then skillful coping might involve in the production of inverse models in response to the solicitations of the situation, and forward dynamic models, which predict the next internal state of the system given the current state and the motor command. To distinguish the movements of skillful coping from full-blown motor actions, I will refer to them as 'deeds', a term I borrow from Rowlands (2006).

The lack of forward output models raises the question of how deeds avoid being inaccurate, given that they must be generated as appropriate responses to fine-grained solicitations from the environment (such as the speed, direction and position of the tennis ball in relation to the player)? In answer to this, I propose that the final outcome of each deed is fed back as information for the generation of new deeds. In music performance, this means that the just-performed musical event registers in perception and provides the context for the deed about to be performed. This is similar to the way in which we reparameterize ballistic action such as throwing a ball, except that it occurs as part of a currently ongoing series rather than for isolated actions. Note that Dreyfus's (1996; 2002b) examples of skillful coping tend to be ongoing processes, such as playing tennis or driving a car. His learners have to develop to a state of expertise in a particular field from an initial state of awkward and conscious actions, which is consistent with learning to produce motor responses within a space of familiarity (as opposed to requiring feedback during the course of an action). Furthermore, the ongoing fine-tuning of actions in the absence of forward output models could occur in response to local difference in conditions, as when, for instance, we adjust to a faster or slower ball in a game of squash.

A question raised by the lack of goal representations for the actions of skillful coping is, What constrains the performance of the actions? In what terms can any action be specified as reducing deviation from a satisfactory gestalt (Dreyfus 2002c: 396), and given that specification, what constrains an action to meet it? This is the topic of the next section.

10.4.4 Where are the goals in goal-directed motor actions?

There are two levels of constraint in skillful coping which must be considered, although neither (I will argue) constitutes true goal representation.

First, it is important to note that representations are not entirely absent from Dreyfus's account of the development of skillful coping. Skillful coping is first learnt in the context of an explicit goal. A representation comes about, by some means, of a goal which is fulfillable by motor action. For instance, someone might be learning the game of tennis, and represent the goal of returning the ball over the net so that it lands within the lines. It is typical of Dreyfus's examples of skillful coping that one, or a related family, of overarching goals relates to a set of actions which are repeated with many fine-grained differences (such as hitting the ball over the net or

guiding the car on the road). What skillful coping then provides is control towards that end, adjusted in a fine-grained way to specific situations as they arise. In other words, skillful coping works to achieve a predefined goal within a field of possible situations and motor responses which will achieve the goal within those situations.

While Dreyfus talks of representations as causing or triggering subsidiary coping movements (although not controlling them) (2002b: 421), I think that the point about coping movements is that, once learned, they can be elicited by appropriate situations and can proceed and develop without the need for a triggering representation. In fact, Walter Freeman's (1991) model of brain structure which Dreyfus draws on to support the notion of skillful coping, rather than associating responses to specific stimuli,

produces its own attractors, which are evoked and modified on the basis of further experience. Once the stimulus from the current situation has triggered a burst of neuronal activity that forms a specific attractor landscape, the attractor landscape takes over and draws the system to relax into a specific attractor.

(Dreyfus 2002b: 421-22)

In this way, the original goal is preserved implicitly in a repertoire of behaviours which are elicited by the kinds of situations in which they were developed. Thus, implicit goals resulting say, from socialization, may never have been mentally represented. No goal representation is required to initiate the bodily movements involved in cases such as 'when several people find themselves together in an elevator and each simply moves to a comfortable distance from the others' (Dreyfus 2002b: 417).

The idea of an implicit goal built into behavioural responses to the situation can be compared to dynamical systems such as the Centrifugal Governor for steam engines designed by Watt (see Gelder 1995: 347ff). The centrifugal force on the arms of the governor cause them to move up in response to increased speed (thus closing the throttle and reducing the speed) and they move down in response to reduced speed (thus opening the throttle and increasing the speed). The point about the Centrifugal Governor is that its goal of equilibrium at a particular speed is implicit in its design. This is similar to skillful coping, which also has an implicit goal which initially constrained the development of each particular kind of skillful coping. However, skillful coping, on Dreyfus's account, produces its own attractor basins, so that it makes sense to ask, What else constrains the development of these, besides the implicit goal?

Naturally, some constraints will follow from the particular body structure and muscular development of the individual engaged in skillful coping. The previous development of skills will also play a role in encouraging or discouraging development in particular directions. Within the space defined by these aspects, however, there will be room for variation according to personal preference and bodily pleasure. I see this space of possible variation as an avenue of freedom from the sedimentation of perception and action.

10.5 Music performance as skillful coping

There are some aspects of skillful coping which make it a promising candidate for creative music performance and some which might not. Dreyfus characterises motor intentionality as nonconceptual and perception associated with it as responsive to the situation as an integrated whole:

Just as the body set involved in the practical perception of an object is too responsive to the specific *external* context to assure reidentification in other contexts, the body set for coping with the whole object makes it impossible to isolate the various characteristics of the object from their *internal* context as characteristics of that specific object.

(Dreyfus 2002c: 403)

The response to the situation in all its concrete specificity fits with the richness of nonconceptual perception identified in Chapter 6. The learner driver, in acquiring skills, comes to respond to the whole situation in a flexible way (Dreyfus 2002b: 419)—this is the kind of characteristic one would look for in a theory of creative music performance.

Motor intentionality and absorbed coping—as Dreyfus describes them—seem to be well-suited to the processuality of music. Dreyfus points out that motor intentionality opens a 'horizontal field' around the body and the better coping ability towards the front of the body makes the horizontal field temporal:

In everyday coping, what has yet to be faced is experienced as in the future, what is being faced and dealt with makes up the pragmatic present, and what already has been faced and is behind us is experienced as both spatially and temporally passed.

(Dreyfus 2002c: 399)

In this spatial and temporal field, the physical context for motor activity is always changing and never repeat themselves in exactly the same way: the conditions of success are therefore always in flux (Hudin 2006: 578). In music performance, the 'physical context' can be thought of as largely provided by the musical events which have just been performed by the individual and other performers—and therefore in constant flux. Both the context and the motor response will be processual.

The argument that skillful coping proceeds as a series of deeds without forward models of expected sensory effects, works in an especially interesting way for the performance of music and dance. The way in which open loop movements are particularly suitable for performance is easier to explain for dance and then generalise to music. First, it is necessary to conceive of dance as essentially creating abstract immanent meaning through the rhythms and lines of the movements of the dancer, similar to the way I argued in Chapter 2 that the essential function of music is to create meaning immanent in sound. Of course, much dance includes mimetic and referential aspects, but I want to put these aside to focus on the essential abstractness of the

art. From the viewpoint of immanent meaning, the outcome of actions undertaken in dance is precisely the movements made rather than any change those movements effect in the world. The normal model of feedback corrections via forward output models has the trajectory of the effector limb monitored and corrected according to expected sensory input throughout the progress of the action towards its eventual outcome (such as reaching for a coffee cup). But the 'goal' of dance is immanent in the movements which make up the action—any end result (such as finishing with the limb in a particular position) is additional to creative control of the trajectory of the movement. The unsuitability of forward output models for music performance follows a similar argument, although there will be a moment within the action when no sound is being immediately produced, such as before the pick reaches the guitar string or after a note has been sounded on the piano. However, musicians know that the trajectory of the effector limb prior to or between sounding notes has an effect on the sound. There is no room for correcting a movement to produce a sound, and musicians typically practice until such movements are sure and smooth.

One potential difficulty for viewing creative music performance as a form of skillful coping is that, rather than a context which provides events involving physical objects, music constructs a series of events. The performer is either improvising or else playing material which has been previously developed and is now set. Instead of engaging with physical objects to alter the course of events, the musician engages with the sound. (Of course the musician engages with the physical object which is their instrument, but the events which must meet conditions of satisfaction are the auditory events the instrument causes.) I do not see this as a serious difficulty, however. Dreyfus's 'absorbed coping' is certainly not specified in any way which precludes the production of a series of events. It is just that the situation with which the musician engages perceptually is not the physical world of objects visually perceived, but auditory and processual world of music. Music shares the same forward motion through time as, say, a tennis match or driving a car: responses to aspects of the situation are time-critical and ephemeral.

The particular case exemplified by hardcore music in which what is to be played is predetermined in all but the fine details of timing, timbre, and loudness can be thought of as the kind of thing that we do when we drive a car. When driving, the car continues usually on a more or less predetermined route (driving home from work, perhaps) with skillful coping interacting with the continuing movement of the car to control details of its trajectory in relation to the perceived situation—the precise path it travels and its speed at any time.

Most accounts of skillful coping relate to possible actions in relation to visible objects (albeit sometimes moving ones). Skillful coping as an approach to music performance is about a series of auditory events, that is, something which occurs through time and which offers motor possibilities in relation to its course, rather than an object or objects which can be acted on.

10.6 Creativity versus sedimentation

The final potential problem for a skillful coping theory of creative music performance will actually provide some useful insights into how it might work. The potential difficulty is the tension between creativity and flexibility (as required for music performance) on the one hand, and what appears to be the habitual or automatic nature of skillful coping, on the other. Merleau-Ponty, for instance, writes of the bodily acquisition of 'habit' (1962: 144).

On closer inspection, however, skillful coping looks less like simple habit and more like a set of behaviours which are actively created. The key is in the alleged normativity of motor intentionality:

Dreyfus' motor intentional movements are intentional in that they are normative. Their normativity resides in the body's sensing how the movement fits the particular circumstances both surrounding and eliciting it.

(Hudin 2006: 577-78)

On the one side, skillful coping is inescapably rooted in concrete reality—the interaction of body movements and the world will play out ultimately according to the laws of physics. On the other side, the intentions generated are nonconceptualized and fluid, constantly open to reinterpretation (therefore, not normative after all):

Todes agrees with Merleau-Ponty who maintains that, in absorbed coping, the agent's body is led to move so as to reduce a sense of deviation from a satisfactory gestalt without the agent being able to represent what that satisfactory gestalt will be like in advance of achieving it.

(Dreyfus 2002c: 396)

In order to explore these two properties of skillful coping, I want to adapt an argument of Mark Rowlands (2006) for the independent normativity of the 'deeds' which subserve intentional actions.

Deeds are hierarchically structured products of the dorsal stream. In calling them hierarchically structured, I am drawing attention to the fact that the position of a deed in an overall sequence is crucial to its efficacy. In terms of their efficacy in allowing a successful reception of the ball, the subtle adjustments of fingers required after the fingers have been positioned either up or down only make sense precisely after the fingers have been thus positioned. Most complex behaviours can be broken down into a sequence of hierarchically nested deeds.

(Rowlands 2006: 405)

Deeds are active, rather than passive—in Rowlands's account, they are active in virtue of the fact that they are performed because of the general antecedent intention they subserve (in the example above, to catch a cricket ball). This is one aspect of Rowlands's argument with which I

disagree. I have already argued that skillful coping can occur in the absence of any except implicit goals. It is fundamental to Dreyfus's account of skillful coping that it can be '*purposive* without the agent entertaining a *purpose*' (2002a: 379).

Rowlands argues that deeds do not inherit the identity of the action they subserve from its antecedent intention. The antecedent intention is not sufficient to distinguish between the many deeds which go into satisfying it.

If a property plays no role in individuating an item—in the sense of being specified in a criterion of identity for items of that kind—then the property cannot be essential to that item.

(Rowlands 2006: 406)

So, if deeds are essentially normative, then that normativity must be independent of the normativity of the antecedent intention. Rowlands proceeds to argue for the normativity of deeds in terms of their historical-teleological development. To satisfy the teleological constraint, a deed needs to possess the 'proper function' either of tracking the environmental feature which produces it, or of enabling a 'representational consumer' to achieve some task in virtue of tracking the feature (2006: 406). A bystander might stroll onto a cricket pitch and throw up their hands to protect themselves from a flying ball, thus taking a catch by accidentally making exactly the same movements as a trained fielder would to purposely catch the ball. The fielder's deeds possess a 'proper function' which the bystander's deeds do not, a proper function provided by the history of the deeds in training to fulfill that function (Rowlands 2006: 407). Rowlands goes on to provide a further example from a study of saccadic eye movement strategies employed by cricket batsmen in hitting the ball (Rowlands 2006: 411). The point he is making is that deeds can be identified which are normative but which do not acquire their normative status from the intentions, volitions or tryings of the subject (Rowlands 2006: 410).

Rowlands wants to use the independent normativity of deeds to ground representation:

[T]raditionally, the normative status of actions is seen as inherited from that of intentional states—intentions, volitions, tryings, and the like. More generally, it has been standard to think of normativity as something passed from the inside out: its proper residence is the mind and from this it can pass out, or be projected, into the world.

[...]

The normativity of deeds is quite different. This normativity is not inherited from other normative states; it is *sui generis*. In virtue of their historical character, deeds are infused with normativity. The saccadic deeds involved in visual perception are normative because they are *learned*, therefore have a *history*, and therefore have a *proper function*. And this is so quite independently of any connection they bear to intentional states.

(Rowlands 2006: 415)

However, the proper function of deeds is not quite so independent of the action goals which they subserve. By Rowlands's own account, it is precisely the history of training to fulfill an action goal (to field the ball, or hit the ball with the bat) which ensures that the deeds involved have a proper function. Further, what if the bystander who actually caught the ball then decided that they were a natural fielder and took up the game? In terms of the development of action-effect associations as described by Proust (1999) above, what is the status of their deeds constituting the original, accidental catch, once they have become an expert fielder? Without the action goal to contextualize the history, the deed has no proper function.

I want now to put aside Rowland's preoccupation with normativity in favour of a focus on intent. Rowlands's deeds can be thought of as the movements controlled by inverse models, applied in a specific situation. The same movements can subserve different action goals (such as fielding a ball or covering the face for protection) and they acquire their meaning in the particular context in which they occur, not just by virtue of the action they subserve but also by the details of their situation in space and time relative to events and objects in the environment. The point about skillful coping is that it does not drive towards one particular function, but is open to use by any function it can fulfill. It is the fluid product of the interaction between real-world situations and body skills. Paradoxically, it is the concrete facticity of what Rowland calls 'deeds' which allows their fluidity of function: because they are concrete interactions between physical entities (body and environment) there is always more to them than can be represented (since representation entails a reduction of information). It is just this combination of richness and indeterminacy which is a fertile ground for creativity.

One way to understand the relation between a particular end and the means one might adopt to attain it, is to take the end as something that determines the means. In this case, I explicitly identify the goal first, and then I start thinking about (or perhaps immediately see) how I will get there. A different way to understand the relation between end and means is to begin to see the end only through the means. In this case I don't begin with a specific end in mind, or there are several possible goals that I can strive for, yet, without knowing the goal I nonetheless may know that I can do something with what I have at my disposal. I know I have the means to do something but the precise outcome of my action will not be determined until I begin to act or manipulate the means. Or I may not know the outcome until the outcome is accomplished. I may surprise myself. In the first case we have something like mechanical technique; in the second case we have something closer to art and the possibility of creativity.

[...] Expertise, then, would involve innovation and the ability to discover and define new goals within action that is already underway. It is also possible, of course, that this creative ability would require further distinctions between mere expertise and higher levels of performance.

(Gallagher 2000: 5)

After all, at least part of the difference between art and sport is that the goal of a sport is defined, while it is the nature of art to define its goals in their fulfilment. In applying the notion of skillful coping to creative music performance, it is important first to accept that skillful coping can be 'purposive without purpose'.

My conception of the process is that, in creative music performance, skillful coping subserves no goal at all, not even an implicit one. The pragmatic dimension of motor action is activated as play. Conscious nonconceptual relation perception of the just-performed passage provides the context to which skillful coping responds, according to the available bodily skills. Importantly, there is no mental representation of the passage before it is performed—perception of it is potentially a surprise for the performer. The necessity of perception of the performed passage after it is performed ensures that the context for skillful coping is one of concrete facticity, rather than sedimented mental representation. Any goal is emergent rather than pre-existing, and in any case not necessarily stable throughout the performance.

10.7 Summary

In this chapter, have made an argument for Dreyfus's skillful coping as the means by which creativity can be achieved in music performance. I have reviewed Carruthers's (2007) Creative Action Theory of creativity as a possible model of performance creativity, and criticised it on the grounds that his model requires the representation of action goals as a means of constructing creative actions. I suggest that the consideration which led Carruthers to the requirement of action goal representations was the difficulty in explaining how unrepresented actions might be meaningful. I argued, with reference to Proust (1999), that action goals are subject to a similar kind of sedimentation as are perceptions. I introduced Dreyfus's (2002a) concept of skillful

coping, via Merleau-Ponty's (1962) notion of motor intentionality. Finally, I raised the question of forward and inverse models of motor actions, as discussed by Carruthers in relation to motor creativity and by Proust in relation to the sedimentation of motor actions. I hypothesized that skillful coping proceeds without forward output models, which provide predictions of sensory feedback on the basis of the predicted state of the motor system. I have argued that the deeds of skillful coping are guided or coordinated by an implicit goal which need not be represented to the agent but which guided the acquisition of skillful coping behaviours. Finally, I argued that creative music performance occurs in a context of skillful coping.

11 Conclusion

In this thesis, I have addressed two problems apparent for a theory of creative music listening and performance. The first is the issue of how listeners can escape sedimented perceptions in order to experience novel perceptions of musical organisation. The second is how performers are able to produce novel organisations of musical elements given that action goals are sedimented in the same way that perceptions are. As an example of creative music performance, I introduced statements by hardcore rock performers which showed that they valued both the sense of being surprised by their own performances and an indefinable sense of the musicians in a band performing cohesively and in active response to each other.

I have drawn on the music aesthetics of Thomas Turino, Jean-Jacques Nattiez, Eduard Hanslick and particularly Susanne Langer to identify the essential characteristics of music. These are: immanence of meaning in the sound of music, indeterminacy and polysemy of meaning, and processuality. Music constitutes a system of mutually referring signs which signify through the concrete relations they have to other signs in the system. It is this that differentiates musical signs from linguistic signs (which do not hold concrete relations either with what they signify or with other linguistic signs). It is in referring mutually that musical signs create immanent meaning. The concrete relations between signs by which they refer are the source of polysemy, since the concrete relations are too numerous to specify and there exist also relations between relations (second-order relations). Music is subject to 'semantic arrest'—its meanings are never made determinate. Music is processual, in that the system of signification is ongoing while the music lasts and the immanent meaning created at any time is transitory.

I have characterised the system of musical signification as a system of 'congeneric iconic signs'. Musical signs are Peircean icons, since they signify by resemblance. They create a signified through the abstract intersection of two concrete signifiers. Musical signs are congeneric in the sense that they are of the same kind; there is no asymmetry between signifier and referent. Because of this, individual musical events serve as both signifiers and referents of iconic signs. The notion of congeneric iconic signification is central to the thesis, since it provides a unified way of looking at abstraction in eidetic variation, observational concepts, and nonconceptual relational perception, despite the different processes which these three approaches to perception exhibit.

The perception of immanent meaning in music depends on a process of perceptual reduction, by which primary representation is given to proximal percepts rather than to the objects and events of the real world which are normally given directly to perception. The immanent essences revealed by Husserl's process of eidetic variation deal with proximal percepts rather

than with transcendent perceptions. Observational concepts can also be applied to immanent proximal percepts. Both immanent essences (such as the objective Schaefferian sound object) and observational concepts are shown to be subject to the sedimentation of perception. In both cases, this is due to the present percept being assimilated to an existing concept. I conclude that creative listening will require nonconceptual perception, which will be dependent on percepts available to present perception.

Perception can become sedimented both through the holding of explicit beliefs (concepts) or through repeated perceptual experiences in a context which reinforces perceiving in a particular way. Either (explicit belief or repeated experience) can give rise to 'theory-laden observation', that is, perceptions which can differ according to the beliefs or previous enculturation of the individual having them. In music listening, examples of theory-laden perception can be found both due to the holding of an explicit theory and to enculturation in a particular style.

A salient aspect of Husserl's phenomenology of time consciousness is the continuing phenomenological identity of an object of perception through changes in its properties. I argue that identity without identification can found an open intentionality for perception—that is, the ability to perceive something without perceiving it *as* something. Identity without identification can be naturalized for visual perception through the capacity for individuation and tracking of visual objects without identification, as described by Pylyshyn. In audition, the mechanisms described by Bregman of auditory scene segregation into streams, and segmentation into temporally discrete events, serve the same purpose. Pylyshyn argues that the modular processes of individuation and tracking supply proto-concepts of perceptual objects to the subject, to which properties can be bound and from which concepts can be developed.

Dretske's notion of 'thing-awareness', leading to the possibility of a lowest-level concept of <that object>, can be viewed as raising a proto-concept of an object of perception to the status of a concept, but without attaching properties to it. Thing-awareness can be viewed as the conceptual component of demonstrative concepts, which have nonconceptual contents.

Classification is a process of reduction of the information available in percepts, so that a range of inputs (such as different proximal percepts) is assimilated to one output. Digitization or conceptualization reduces the information available in a percept to a single item of information. More broadly, classification requires both abstraction and generalisation. Generalisation is the overlooking of differences between percepts to include more percepts within the classification. Abstraction is the finding of similarities between some percepts in order to exclude others from the classification. Looking at perception in terms of Haugeland's representational genera, I found that in Haugeland's 'iconic representations' the representational content is partly carried by the concrete relations between the representations. This is just the way Susanne Langer described musical signs, and contrasts to her and Haugeland's descriptions (respectively) of linguistic and logical signs, where concrete relations between the signs do not contribute to the meaning.

The analogue perceptual content described by Peacocke meets Haugeland's requirement for iconic representations, in that analogue content preserves in the perceptual representation relations of magnitude found in the objects of perception. Nonconceptual relational perception is ideally suited to the control of action, since it preserves both relations between objects in the environment and relations of the perceiver to the surrounding environment—it is situated both spatially and temporally.

Nonconceptual relational perception can be argued to be part of the normal way of listening to music for someone not trained in music theoretic concepts. For instance, nearly everyone can recognize at least one tune, but most people not specially trained to do so cannot reidentify instances of pitch relationships in the tune. Since the perception of relations between pitches is necessary in order to recognize a tune, it follows that the relationships must be perceived nonconceptually.

If music is perceived nonconceptually with relational perception, the richness of relations between the music elements which is preserved in the perceptual representation might account for the polysemy of music. On the other hand, the sense both of recognition and of information received that a music analyst can experience with regard to an analysis of a music work with which they are familiar, might be due to the analysis conceptualizing some aspect of the work which had been nonconceptually perceived.

Nonconceptual relational perception can be seen as congeneric iconic signification. Characterising it in this way makes it easier to conceive of a dynamically formulated abstract signified which changes as new musical events occur. The lability of the dynamic abstraction might account for both the indeterminacy and the processuality of music. Since the abstract signified of iconic signification does not exhaust the concrete signifier, congeneric iconic signifier-referents can participate in the formulation of different abstract signifieds.

Nonconceptual relational perception appears to escape the sedimentation of conceptual perception. However, the problem remains of creative performance. Musical performers must produce novel organisations of musical elements before they can hear them. If imagination does not escape sedimentation, how can this be achieved?

I explore the historical-teleological process by which action goals are acquired and necessarily become sedimented. I note that while action goals are necessarily re-identifiable in different contexts (and therefore conceptual), the movements which subserve goal-directed actions are nonconceptual and indexical. The connection between the inverse models which project movements, on the one hand, and the action goal or outcome on the other, is provided by forward models of sensory outcomes. I argue that inverse models and actions goals are acquired together in a developmental process, but that inverse models, once acquired, are available for use in a range of action goals. The movements projected by inverse models acquire their meaning only in the context of the action goal they subserve and the detailed situation in which they occur.

Movements projected by inverse models are a good candidate for the actions of Dreyfus's 'skillful coping'. The actions of skillful coping are made in response to the solicitations of the current situation. They can operate without an explicit goal representation, although they often occur in the context of an implicit goal representation, either because they were originally learnt in the context of an explicit goal (such as learning to play the game of tennis) or because they were learnt directly through eg. a process of enculturation, with the goal ever being made explicit. Dreyfus argues that the actions of skillful coping are not mentally represented and this indicates that no forward model is in operation. Forward models depend on the specification of an action goal, and also have been found to contribute to the sense of agency present in goal-directed actions and absent in skillful coping.

Skillful coping is nonconceptual action and the perception associated with it is responsive to the situation as an integrated whole. In this it is like nonconceptual relational perception. The actions of skillful coping might be expected to produce outcomes which took account of the concrete relations between the representational contents of perceptual events. In skillful coping guided by visual perception, this would no doubt relate to magnitudes such as distances between objects and eg. rates of change in the size of objects in proximal percepts in the perception of visual flow. In skillful coping for music performance, the concrete relations represented and produced would be in terms of durations, loudness, pitch, spectral complexity and so on, and in terms of rates of change of these.

Similarly to the way immanent meaning in music severs the normal everyday connection between perception and events in the world, a focus on what Proust calls the 'pragmatic dimension' of action—the movements projected by inverse models—can work to sever the connection between action and action goals. In place of the implicit goal which contextualizes skillful coping in eg. sports, the goal in skillful coping for creative music performance is emergent and labile.

In summary, the means by which listeners are able to apprehend, and performers to produce, novel organisations of musical elements are related. Both depend on a form of nonconceptual relational perception ideally suited to action. In the case of listeners, their mental representation of the music is in this form. This kind of perception results in apprehensions which are not dependent on sedimented perceptions because it does not rely on concepts already possessed by the perceiver. Nonconceptual relational perception rather preserves in the perceptual representation, relations of magnitude which exist in the sound. This allows the active construction of a novel apprehension related precisely to the details of the sound. The situation for music performers is similar, except that their apprehension of the novel organisation of musical elements issues first in the form of motor commands, prior to any mental representation at the personal level. For performers, the appropriate approach to motor action is what has been called 'skillful coping'—a flow of appropriate responses as solicited by the immediate state of the environment and the organism's situation within it. In most kinds of skillful coping (such as driving a car or playing a sport) the contextualizing goal for the

movements of skillful coping is predetermined and implicit. In music performance which exhibits motor creativity, skillful movements are carried out in the absence of either an explicit or an implicit goal—rather, the goal is created in the ongoing performance, and is labile and dynamic.

REFERENCES

- Andersen, H. and R. Grush (2009). "A Brief History of Time-Consciousness: Historical Precursors to James and Husserl." Journal of the History of Philosophy 47(2): 277-307.
- Battel, G. U., R. Bresin, et al. (1994). Neural networks vs. Rules system: evaluation test of automatic performance of musical scores. Proceedings ICMC, San Francisco, ICMA.
- Bayne, T. and E. Pacherie (2007). "Narrators and Comparators: The Architecture of Agentive Self-Awareness." Synthese 159: 475-91.
- Beck, L. W. (1944). "Judgments of Meaning in Art." The Journal of Philosophy 41(7): 169-78.
- Berger, H. M. (1999). "Death metal tonality and the act of listening." Popular Music 18(2).
- Berkeley, G. (1710). Introduction to Principles of Human Knowledge. The Works of George Berkeley Bishop of Cloyne. Vol II (1949). AA Luce and TE Jessop, eds, Nelson.
- Bermudez, J. L. (1995). "Nonconceptual Content: From Perceptual Experience to Subpersonal Computational States." Mind & Language 10(4): 333-69.
- Bermúdez, J. L. and F. Macpherson (1998). "Nonconceptual Content and the Nature of Perceptual Experience." The Electronic Journal of Analytic Philosophy 6(2).
- Bharucha, J. J., M. Curtis and K. Paroo (2006). "Varieties of musical experience." Cognition In press.
- biRdbATh. (n.d.). MySpace page. Accessed 2008, from <http://www.myspace.com/birdbath>.
- Blakemore, S. J., C. D. Frith and D. M. Wolpert (1999). "Spatio-Temporal Prediction Modulates the Perception of Self-Produced Stimuli." Journal of Cognitive Neuroscience 11(5): 551-59.
- Boden, M. A. (1990). The Creative Mind: Myths and mechanisms. London and New York, Routledge.
- Borges, J. L. (1968). Funes, the Memorious. A Personal Anthology. Anthony Kerrigan, ed. London, Jonathon Cape.
- Bregman, A. S. (1990). Auditory Scene Analysis: The Perceptual Organization of Sound. Cambridge, MIT Press.
- Bresin, R. (1998). "Artificial Neural Networks Based Models for Automatic Performance of Musical Scores." Journal of New Music Research 27(3): 239-70.
- Bresin, R. (2000). Rule-Based Emotional Coloring of Music Performance. Proceedings ICMC, San Francisco, ICMA.
- Bresin, R., G. De Poli and A. Vidolin (1992). Symbolic and sub-symbolic rules system for real time score performance. Proceedings ICMC, San Francisco, ICMA.
- Briscoe, R. E. (2008). "Another Look at the Two Visual Systems Hypothesis: The Argument from Illusion Studies." Journal of Consciousness Studies 15(8): 35-62.
- Brough, J. B. (2005). "Husserl and the Deconstruction of Time." Review of Metaphysics 46(3): 503.
- Brown, R. S. (1994). Overtones and Undertones: reading film music. Berkeley, University of California Press.
- Carruthers, P. (2007). The Creative Action Theory of Creativity. The Innate Mind 3: foundations and the future. Carruthers, Laurence and Stich, eds, Oxford University Press.
- Chion, M. (1983). Guide des objets sonores. Paris, Editions Buchet/Chastel.
- Churchland, P. M. (1988). "Perceptual Plasticity and Theoretical Neutrality: A Reply to Jerry Fodor." Philosophy of Science 55(2): 167-87.
- Clayton, M. (2008). Toward an ethnomusicology of sound experience. The New (Ethno)musicologies: 135-69. H Stobart, ed, Scarecrow Press.

- Clayton, M., R. Sager and U. Will (2004). "In time with the Music: The concept of entrainment and its significance for ethnomusicology." ESEM CounterPoint 1.
- Coker, W. (1972). Music and Meaning: a Theoretical Introduction to Musical Aesthetics. New York, Collier-Macmillan.
- Cope, D. (1991). Computers and Musical Style. Oxford, Oxford University Press.
- Cope, D. (2001). Virtual Music: Computer SYnthesis of Musical Style. Cambridge, Mass., MIT Press.
- Cove. (n.d.). MySpace page. Accessed 2008, from <http://www.myspace.com/therealcove>.
- Cumming, N. (1993). "Music Analysis and the Perceiver: A Perspective from Functionalist Philosophy." Current Musicology 54: 38-53.
- Cumming, N. (2000). The Sonic Self. Bloomington and Indianapolis, Indiana University Press.
- Cummins, R. (1989). Meaning and Mental Representation. Cambridge, Mass., The MIT Press.
- Davidson, P. R. and D. M. Wolpert (2004). "Internal models underlying grasp can be additively combined." Exp Brain Res 155: 334-40.
- Davies, S. (1994). Musical Meaning and Expression. Ithaca, Cornell University Press.
- DeBellis, M. (1995). Music and conceptualization, Cambridge University Press.
- Desain, P. and H. Honing (2002). Rhythmic stability as explanation of category size. 7th International Conference on Music Perception and Cognition, Sydney, Causal.
- Desain, P. and H. Honing (2003). "The Formation of Rhythmic Categories and Metric Priming." Perception 32(3): 341-65.
- Drake, C. and J. B. El Heni (2003). "Synchronizing with Music: Intercultural Differences." Annals of the New York Academy of Sciences 999: 429-37.
- Dretske, F. (1993). "Conscious Experience." Mind 102(406): 263-82.
- Dretske, F. I. (1981). Knowledge and the Flow of Information. Oxford, Basil Blackwell.
- Dreyfus, H. L. (1996). "The Current Relevance of Merleau-Ponty's Phenomenology of Embodiment." Electronic Journal of Analytic Philosophy Spring 1996.
- Dreyfus, H. L. (2000). "A Merleau-Pontyan Critique of Husserl's and Searle's Representationalist Accounts of Action." Proceedings of the Aristotelian Society 287-302.
- Dreyfus, H. L. (2002a). "Intelligence without representation - Merleau-Ponty's critique of mental representation." Phenomenology and the Cognitive Sciences 1: 367-83.
- Dreyfus, H. L. (2002b). "Refocusing the question: Can there be skillful coping without propositional representations or brain representations?" Phenomenology and the Cognitive Sciences 1: 413-25.
- Dreyfus, H. L. (2002c). "Samuel Todes's account of non-conceptual perceptual knowledge and its relation to thought." Ratio (new series) XV(4).
- Dryden, D. (2007). "The Philosopher as Prophet and Visionary: Susanne Langer's *Essay on Human Feeling* in the Light of Subsequent Developments in the Sciences." Journal of Speculative Philosophy 21(1): 27-43.
- Elsner, B. and B. Hommel (2001). "Effect anticipation and action control." Journal of Experimental Psychology: Human Perception and Performance 27(1): 229-40.
- Evans, G. (1982). The Varieties of Reference. Oxford, Clarendon Press.
- Fodor, J. (1984). "Observation Reconsidered." Philosophy of Science 51(1): 23-43.
- Fodor, J. A. (1988). "A Reply to Churchland's "Perceptual Plasticity and Theoretical Neutrality"." Philosophy of Science 55(2): 188-98.
- Freeman, W. J. (1991). "The physiology of perception." Scientific American 264: 78-85.

- Friberg, A. and R. Bresin (1997). Automatic Musical Punctuation: A Rule System and a Neural Network Approach. Proceedings of KANSEI - The Technology of Emotion AIMI International Workshop,, Genoa, Italy.
- Friberg, A., R. Bresin, et al. (1998). "Musical Punctuation on the Microlevel: automatic Identification and Performance of Small Melodic Units." Journal of New Music Research 27(3): 271-92.
- Frith, S. (1996). Performing Rites: Evaluating Popular Music. Oxford, OUP.
- Gallagher, S. (1998). The Inordinance of Time. Evanston, Illinois, Northwestern University Press.
- Gallagher, S. (2000). "Representation and Deliberate Action." Houston Studies in Cognitive Science 1.
- Gallagher, S. (2003). "Sync-Ing in the Stream of Experience: Time-Consciousness in Broad, Husserl, and Dainton." Psyche 9(10).
- Garvin, L. (1958). The Paradox of Aesthetic Meaning. Reflections On Art: A source book of writings by artists, critics, and philosophers. Susanne K Langer, ed. Baltimore, The John Hopkins Press.
- Geeves, A. and D. McIlwain (2009). That blissful feeling: Phenomenological conceptions of music performance from one performer's perspective. International Symposium on Performance Science.
- Gelder, T. V. (1995). "What Might Cognition Be, If Not Computation?" The Journal of Philosophy 92(7): 345-81.
- Gracyk, T. (2001). I Wanna Be Me: Rock music and the politics of identity. Philadelphia, Temple University Press.
- Hanslick, E. (1986). On the Musically Beautiful: A Contribution towards the Revision of the Aesthetics of Music (1891), Hackett Publishing Company.
- Haugeland, J. (1991). Representational Genera. Philosophy and Connectionist Theory. William Ramsey, Stephen P Stich and David E Rumelhart, eds. Hillsdale, New Jersey, Lawrence Erlbaum Associates.
- Hermberg, K. (2007). Husserl's phenomenology: knowledge, objectivity and others, Continuum International Publishing Group.
- Hirata, K. and R. Hiraga (2002). Ha-Hi-Hun: Performance Rendering System of High Controllability. Proceedings of ICAD, Rencon Workshop.
- Hirata, K., R. Hiraga and T. Aoyagi (2000). Next Generation Performance Rendering - Exploiting Controllability. Proceedings ICMC, San Francisco, ICMA.
- Hommel, B., J. Müsseler, et al. (2001). "The Theory of Event Coding (TEC): A framework for perception and action planning." Behavioral and Brain Sciences(24): 849-937.
- Hudin, J. (2006). "Motor Intentionality and its Primordality." Inquiry 49(6): 573-90.
- Husserl, E. (1962). Ideas [1928]. New York Collier-Macmillan.
- Husserl, E. (1991). On the Phenomenology of the Consciousness of Internal Time (1893-1917). Dordrecht, Kluwer Academic Publishers.
- Iyer, V. S. (1998). Microstructures of Feel, Macrostructures of Sound: Embodied Cognition in West African and African-American Musics. in Technology and the Arts. Berkeley, University of California.
- James, W. (1891). The principles of psychology. London, Macmillan.
- Johnson-Laird, P. N. (1993). Jazz Improvisation: A Theory at the Computational Level. Representing Musical Structure. P Howell, R West and I J Cross, eds. London, Academic Press.
- Kane, B. (2007). "L'Objet Sonore Maintenant: Pierre Schaeffer, sound objects and the phenomenological reduction." Organised Sound 12(1): 15-24.
- Kelly, S. (2005). The Puzzle of Temporal Experience. Cognition and the Brain: The Philosophy and Neuroscience Movement. Kathleen Akins Andrew Brook, ed. Cambridge, Cambridge University Press.
- Koestler, A. (1975). The Act of Creation. London, Picador (First published in 1964).

- Langer, S. K. (1930). The Practice of Philosophy. New York, Henry Holt.
- Langer, S. K. (1953). Feeling and Form: A theory of art developed from *Philosophy in a New Key*, Routledge & Kegan Paul.
- Langer, S. K. (1969). Philosophy in a New Key: A study in the symbolism of reason, rite, and art. Cambridge, Massachusetts, Harvard University Press.
- Levin, D. M. (1968). "Induction and Husserl's Theory of Eidetic Variation." Philosophy and Phenomenological Research 29(1): 1-15.
- Lidov, D. (1987). "Mind and Body in Music." Semiotica 66(1/3): 69-97.
- London, J. (1998). "Musical Genre and Schenkerian analysis." Journal of Music Theory 42(1 (Spring)): 101-24.
- Longuet-Higgins, H. C. (1987). Mental Processes: Studies in Cognitive Science, part II. Cambridge, Mass., MIT Press.
- Luntley, M. (2003). "Non-conceptual Content and the Sound of Music." Mind & Language 18(4): 402-26.
- Lytard, J.-F. (1991). The Inhuman: Reflections on Time, Polity Press.
- Mazzola, G. and O. Zahorka (1994a). The RUBATO Performance Workstation on NEXTSTEP. Proceedings ICMC, San Francisco, ICMA.
- Mazzola, G. and O. Zahorka (1994b). "Tempo Curves Revisited: Hierarchies of Performance Fields." Computer Music Journal 18(1): 40-52.
- McCauley, R. N. and J. Henrich (2006). "Susceptibility to the Mueller-Lyer Illusion, Theory-Neutral Observation, and the Diachronic Penetrability of the Visual Input System." Philosophical Psychology 19(1): 79-101.
- McGuiness, A. (2005). Microtiming deviations in groove. Centre for New Media Arts, from http://dspace.anu.edu.au/bitstream/1885/42999/1/MICROTIMING_DEVIATIONS_IN_GROOVE_April_2005.pdf.
- Merker, B. H., G. S. Madison and P. Eckerdal (2009). "On the role and origin of isochrony in human rhythmic entrainment." Cortex 45: 4-17.
- Merleau-Ponty, M. (1962). Phenomenology of Perception. London, Routledge & Kegan Paul.
- Meyer, L. B. (1956). Emotion and Meaning in Music. Chicago, The University of Chicago Press.
- Meyer, L. B. (1989). Style in Music: Theory, History, and Ideology. Philadelphia, University of Pennsylvania Press. Paperback reprint, University of Chicago Press, 1996.
- Milner, A. D. and M. A. Goodale (1995). The Visual Brain in Action, Oxford University Press.
- Narmour, E. (1977). Beyond Schenkerism: The Need for Alternatives in Music Analysis. Chicago, University of Chicago Press.
- Nattiez, J.-J. (1990). Music and Discourse: Toward a Semiology of Music. Princeton, Princeton University Press.
- Pacherie, E. (2000). "Levels of Perceptual Content." Philosophical Studies 100: 237-54.
- Payzant, G. (1986). Translator's Preface. On the Musically Beautiful. Geoffrey Payzant, ed, Hackett Publishing Company.
- Peacocke, C. (1983). Sense and content, Oxford University Press.
- Peacocke, C. (1986). "The Inaugural Address: Analogue Content." Proceedings of the Aristotelian Society. Supplementary Volumes 60: 1-17.
- Peacocke, C. (2001a). "Does Perception Have a Nonconceptual Content?" The Journal of Philosophy 98(5): 239-64.

- Peacocke, C. (2001b). "Phenomenology and Nonconceptual Content." Philosophy and Phenomenological Research LXII(3).
- Peirce, C. S. (1955). *Logic as Semiotic: The Theory of Signs*. Philosophical Writings of Peirce. Justus Buchler, ed. New York, Dover Publications, Inc.
- Petit, J.-L. (1999). *Constitution by Movement: Husserl in Light of Recent Neurobiological Findings*. Naturalizing Phenomenology. Jean Petitot, Francisco J Varela, Bernard Pachoud and Jean-Michel Roy, eds. Stanford, Stanford University Press.
- Pressing, J. and G. Jolley-Rogers (1997). "Spectral properties of human cognition and skill." Biological Cybernetics 76: 339-47.
- Prinz, W. (1997). "Perception and Action Planning." European Journal of Cognitive Psychology 9(2): 129-54.
- Proust, J. (1999). "Indexes for action." Revue Internationale de Philosophie, Volume Neurosciences 3: 321-45.
- Pylyshyn, Z. W. (2007). *Things and Places: how the mind connects with the world*. Cambridge, Mass., The MIT Press.
- Repp, B. H., J. London and P. E. Keller (2005). "Production and Synchronization of Uneven Rhythms at Fast Tempi." Music Perception 23(1): 61-78.
- Robbins, P. "Modularity of Mind." *The Stanford Encyclopedia of Philosophy* (Summer 2009 Edition), Edward N Zalta, (ed.), <http://plato.stanford.edu/archives/sum2009/entries/modularity-mind/>
- Roden, D. (2007). "Sonic Art and the Nature of Sonic Events." European Review of Philosophy 7: 171-90.
- Rosenberg, J. "Wilfrid Sellars." *The Stanford Encyclopedia of Philosophy* (Summer 2009 Edition), Edward N Zalta, (ed.), <http://plato.stanford.edu/archives/sum2009/entries/sellars/>
- Rowlands, M. (2006). "The Normativity of Action." Philosophical Psychology 19(3): 401-16.
- Schaeffer, P. (1966). *Traité des objets musicaux*. Paris, Éditions du Seuil.
- Schuetz, A. (1959). "Type and Eidos in Husserl's Late Philosophy." Philosophy and Phenomenological Research 20(2): 147-65.
- Seager, W. (1999). *Theories of Consciousness: An introduction and assessment*. London, Routledge.
- Searle, J. R. (1983). *Intentionality*. Cambridge, Cambridge University Press.
- Seifert, U., F. Olk and A. Schneider (1995). "On Rhythm Perception: Theoretical Issues, Empirical Findings." Journal of New Music Research 24: 164-95.
- Sellars, W. (1997). *Empiricism and the Philosophy of Mind*. Cambridge, Massachusetts, Harvard University Press.
- Shepard, R. N. (2001). "Perceptual-cognitive universals as reflections of the world." Behavioral and Brain Sciences 24: 581-601.
- Shepherd, J. and P. Wicke (1997). *Music and Cultural Theory*. Cambridge, Polity Press.
- Shklovsky, V. (1917/1988). *Art as Technique*. Modern Criticism and Theory: A Reader. David Lodge, ed. London, Longmans.
- Smalley, D. (1997). "Spectromorphology: explaining sound-shapes." Organised Sound 2(2): 107-26.
- Smalley, D. (2007). "Space-form and the acousmatic image." Organised Sound 12(1): 35-58.
- Stange-Elbe, J. and G. Mazzola (1998). "Cooking a Canon with RUBATO" Performance Aspects of J.S. Bach's "Kunst der Fuge". Proceedings ICMC, San Francisco, ICMA.
- Stevenson, L. (2000). "Synthetic Unities of Experience." Philosophy and Phenomenological Research 60(2): 291-305.
- Taylor, G. (1990). *Reinventing Shakespeare*. London, Hogarth Press.

- Todes, S. (2001). Body and World, MIT Press.
- Turino, T. (1999). "Signs of Imagination, Identity, and Experience: A Peircian Semiotic Theory for Music." Ethnomusicology 43(2): 221-55.
- Tye, M. (1995). Ten Problems of Consciousness: A Representational Theory of the Phenomenal Mind. Cambridge, Massachusetts, The MIT Press.
- Widmer, G. (1994). Learning Expression at Multiple Structural Levels. Proceedings ICMC, San Francisco, ICMA.
- Widmer, G. (1996). "Learning Expressive Performance: The Structure-Level Approach." Journal of New Music Research 25: 179-205.
- Widmer, G. (2000). Large-scale Induction of Expressive Performance Rules: First Quantitative results. Proceedings ICMC, San Francisco, ICMA.
- Widmer, G. (2001). Inductive Learning of general Robust and Local Expression Principles. Proceedings ICMC, San Francisco, ICMA.
- Wolpert, D. M. (1997). "Computational approaches to motor control." Trends in Cognitive Sciences 1(6): 209-16.
- Wolpert, D. M., Z. Ghahramani and M. I. Jordan (1995). "An Internal Model for Sensorimotor Integration." Science 269: 1880-82.
- Wolpert, D. M. and M. Kawato (1998). "Multiple paired forward and inverse models for motor control." Neural Networks 11: 1317-29.
- Zahavi, D. (2003). Intentionality and Phenomenality: A Phenomenological Take on the Hard Problem. The Problem of Consciousness. Evan Thompson, ed. Calgary, Canadian Journal of Philosophy.